Chapter 3
Existing Conditions

CITY OF TIGARD
OREGON

This chapter summarizes existing traffic and transportation conditions in the City of Tigard. The focus is on motor vehicle, transit, pedestrian, bicycle and truck facilities. To understand existing travel patterns and conditions, a variety of aspects of the city's transportation system were considered. In the fall of 1994, an inventory of traffic conditions in Tigard was undertaken to establish a base year for all subsequent analysis. As refinements have been made to the regional land use forecasts over the past five years, conditions have changed. Current, up-to-date counts were conducted in 1997 and again in 1999 at many of the same intersections and at some additional intersections. This data collection update provides a unique opportunity to look at intersection level growth trends within the City over a period of approximately five years. Updated counts were conducted only at intersections, however, the remaining data summarized in this chapter would still apply to current conditions, including relative variation among routes, peaking characteristics, speed zones, high accident locations, bus routes, etc.

The following sections briefly describe existing roadway functions, circulation, traffic speeds and volumes and levels of service in the Tigard transportation system as well as existing pedestrian, bicycle and transit facilities.

STREET NETWORK

The Transportation Planning Rule requires that classification of streets within the City be provided. [1] The classification must be consistent with state and regional transportation plans for continuity between adjacent jurisdictions. The City of Tigard has an existing street classification system. This system is shown in Figure 3-1.[2] The number of lanes on roadways in Tigard are shown in Figure 3-2. Existing typical street cross-sections are shown in Figure 3-3.

1 *Transportation Planning Rule*, State of Oregon, Department of Land Conservation and Development, Section 660-12-020(2)(b), May 1991 (updated November, 1998).

2 *Comprehensive Plan: Transportation Map*, City of Tigard, Ordinance No. ORD-91-13, Map adopted June 11, 1991.

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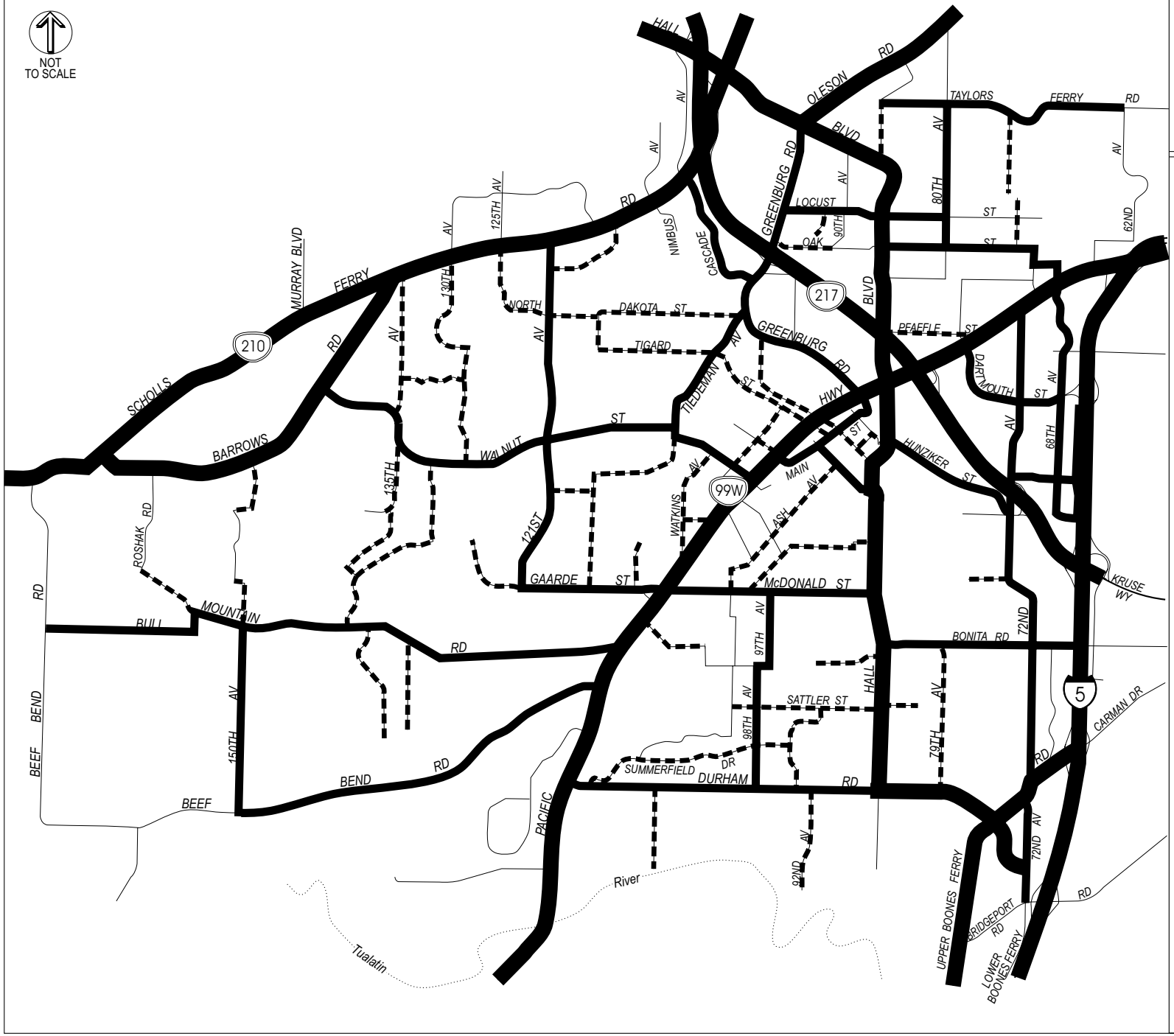

CITY OF TIGARD

Transportation Systems Plan

Legend

- ARTERIAL
- MAJOR COLLECTOR
- MINOR COLLECTOR

Figure 3-1
EXISTING FUNCTIONAL CLASSIFICATION

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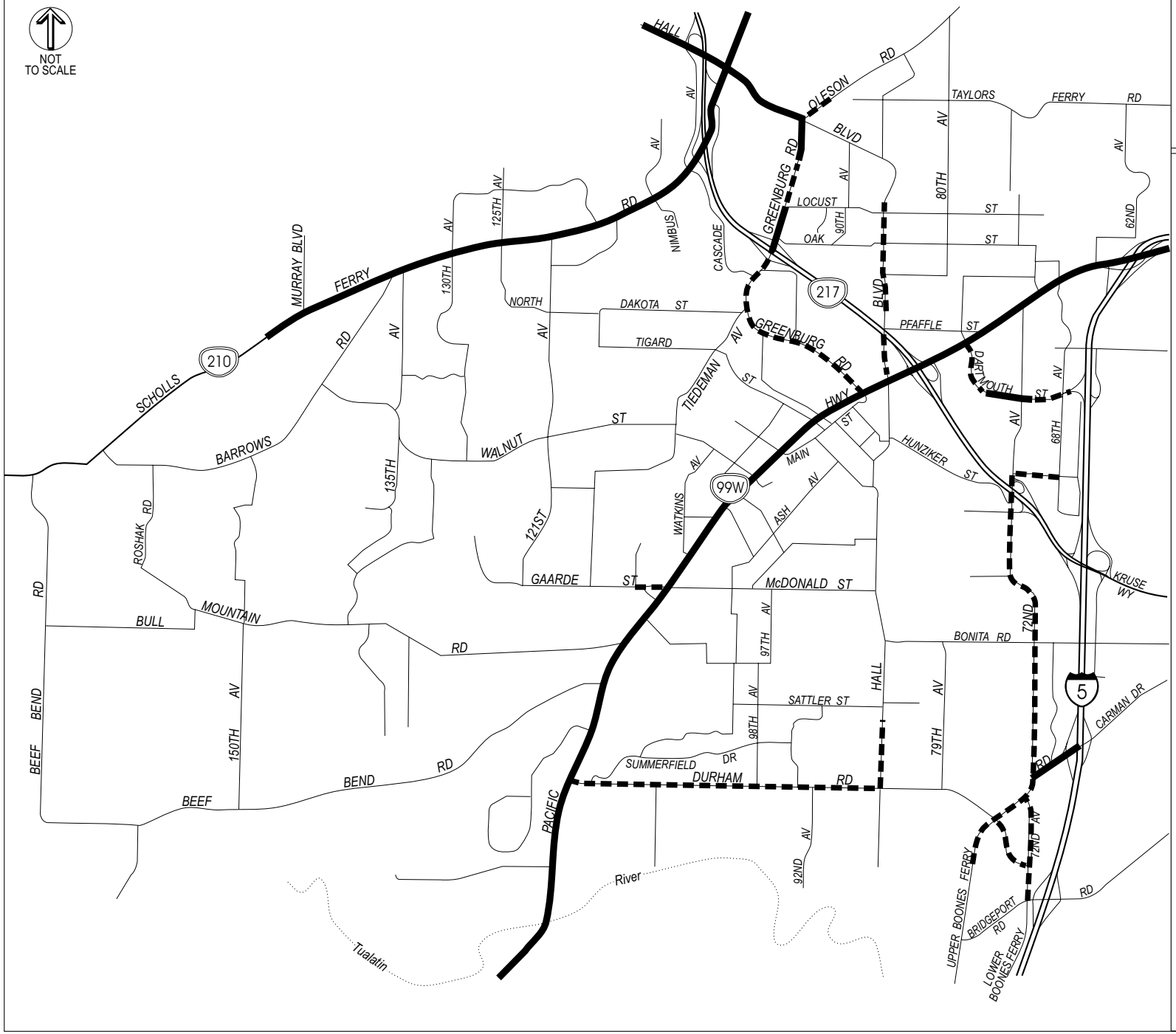

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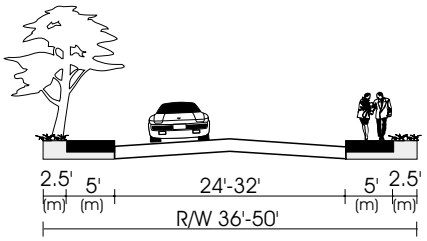
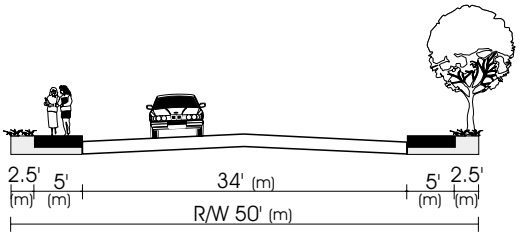
- 3 Lanes
- 5 Lanes

Figure 3-2
ROADWAYS WITH MORE THAN TWO LANES

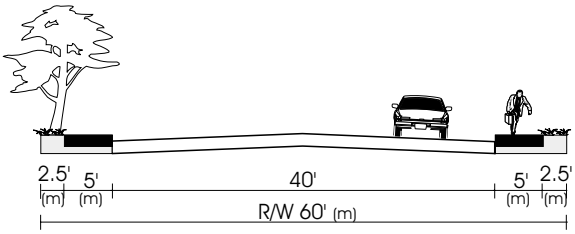
Local Street
Residential



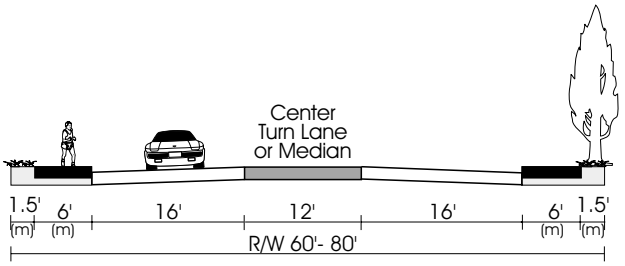
Local Street
Commercial & Industrial



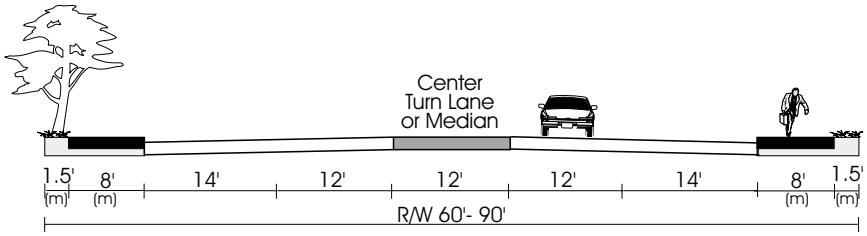
Minor Collector



Major Collector



Arterial



(m) - Minimum Required Width

Figure 3-3
EXISTING
TYPICAL STREET CROSS SECTIONS

Washington County roadway classifications are generally consistent with City of Tigard designations. The following table shows roadway segments where the classification differs between the two jurisdictions. A table summarizing functional classification of Tigard streets by other jurisdictions is shown in the appendix of this report.

Functional Classification Differences

Roadway	**Tigard**	**Washington County**
Greenburg Road	Major Collector	Minor Arterial
Scholls Ferry Road	Arterial	Major Collector

ODOT and **Metro** only classify roads that are of statewide or regional significance, respectively. These classifications are compatible with Tigard classifications, although the specific titles differ to some degree. ODOT and Metro classifications can be found in the Roadway Functional Classification According to Jurisdiction table in the appendix of this report.

TRAFFIC SPEED AND VOLUME

Speed zones on arterials and collectors within the City of Tigard are summarized in Figure 3-4. Speed zones are set by the Oregon's State Speed Control Board (SSCB). The SSCB is an independent board who sets speed zones for city streets, county roads and state highways passing through cities. The SSCB considers any factors such as roadway width, surface, lanes, shoulders, signals, intersections, roadside development, parking, accidents and 85th percentile speed. A decision made by the SSCB is not arbitrary or political, and is based on the considerations described above. Speed zones are set by the State of Oregon using an analysis process which considers the measured 85th percentile speed of traffic on a given roadway. Speed zones are not set arbitrarily or as part of a political decision.[3]

Vehicle speeds on several collector and residential streets are a concern for the community. As examples, streets such as Watkins and Bull Mountain Road are locations mentioned in discussions with the community. In most cases, speeding becomes very noticeable when it is above 35 miles per hour. Speeding can usually be expected on local streets which are wide and straight for long stretches or where downhill grades are extended.

A complete inventory of peak traffic conditions was performed in the fall of 1994 as part of the Tigard Transportation System Plan. The traffic counts conducted as part of this inventory provide the basis for analyzing existing problem areas as well as establishing a base condition for future monitoring. The City of Tigard conducted evening (4-6 PM) peak period turning movement counts at 30 locations to determine intersection operating conditions. Updated counts have been conducted in 1997 and in 1999 at many of these locations, plus a few additional locations, for a total of 62 intersections. Figure 3-5 shows the existing average daily and peak hour traffic volumes on several key routes in Tigard.

On a typical day, ORE 99W is the most heavily traveled street in Tigard. The segment near the ORE 217 ramps carries about 46,000 vehicles per day (two-way). Figure 3-6 shows average daily traffic (ADT) on several routes in Tigard and a comparison of traffic volumes on several routes over the period between 1994 and 1999.

[3] *Speed Zoning: Who Decides*, State Speed Control Board, April, 1992.

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CITY OF TIGARD

Transportation Systems Plan

Legend

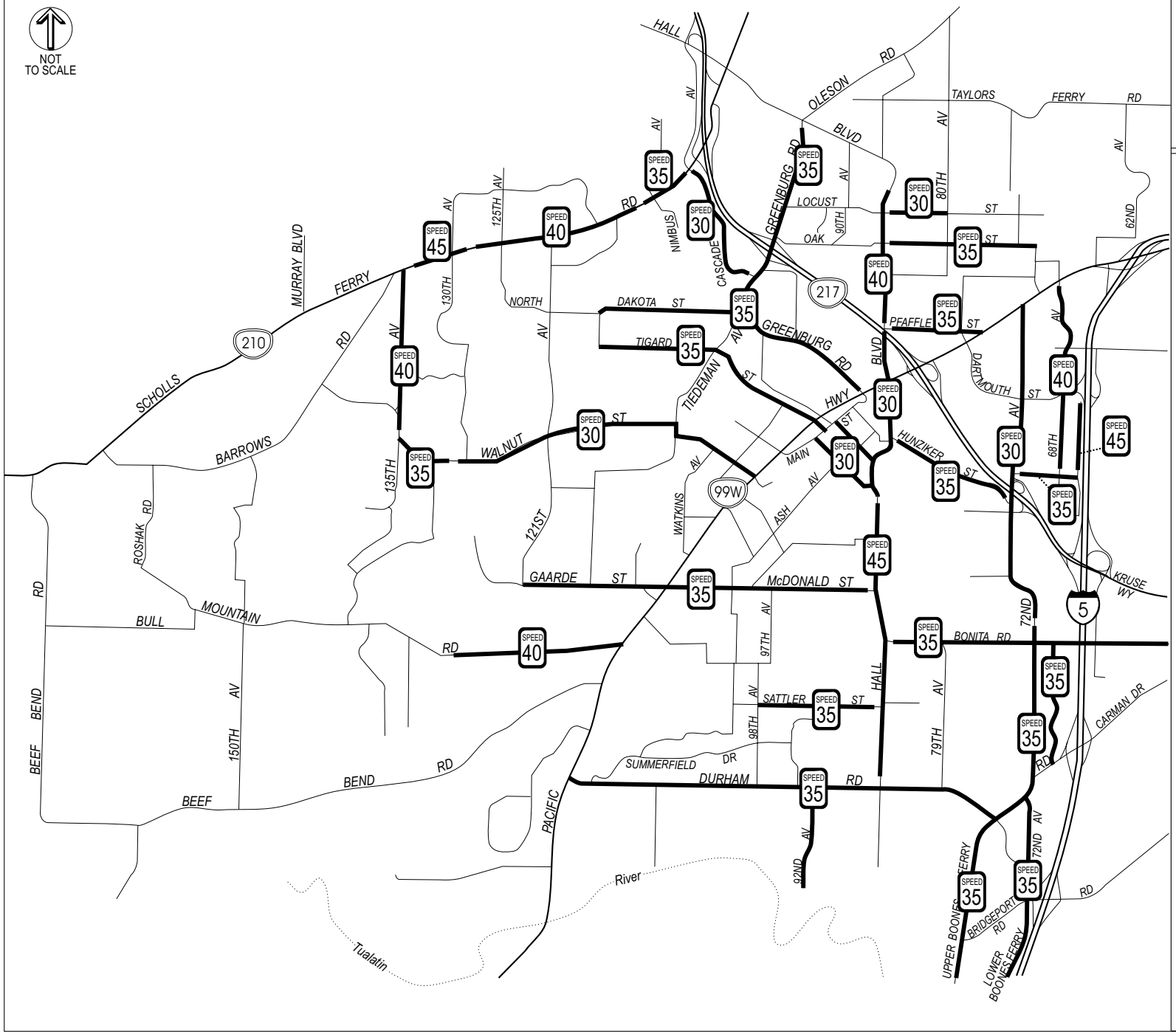

Figure 3-4
EXISTING SPEED ZONES

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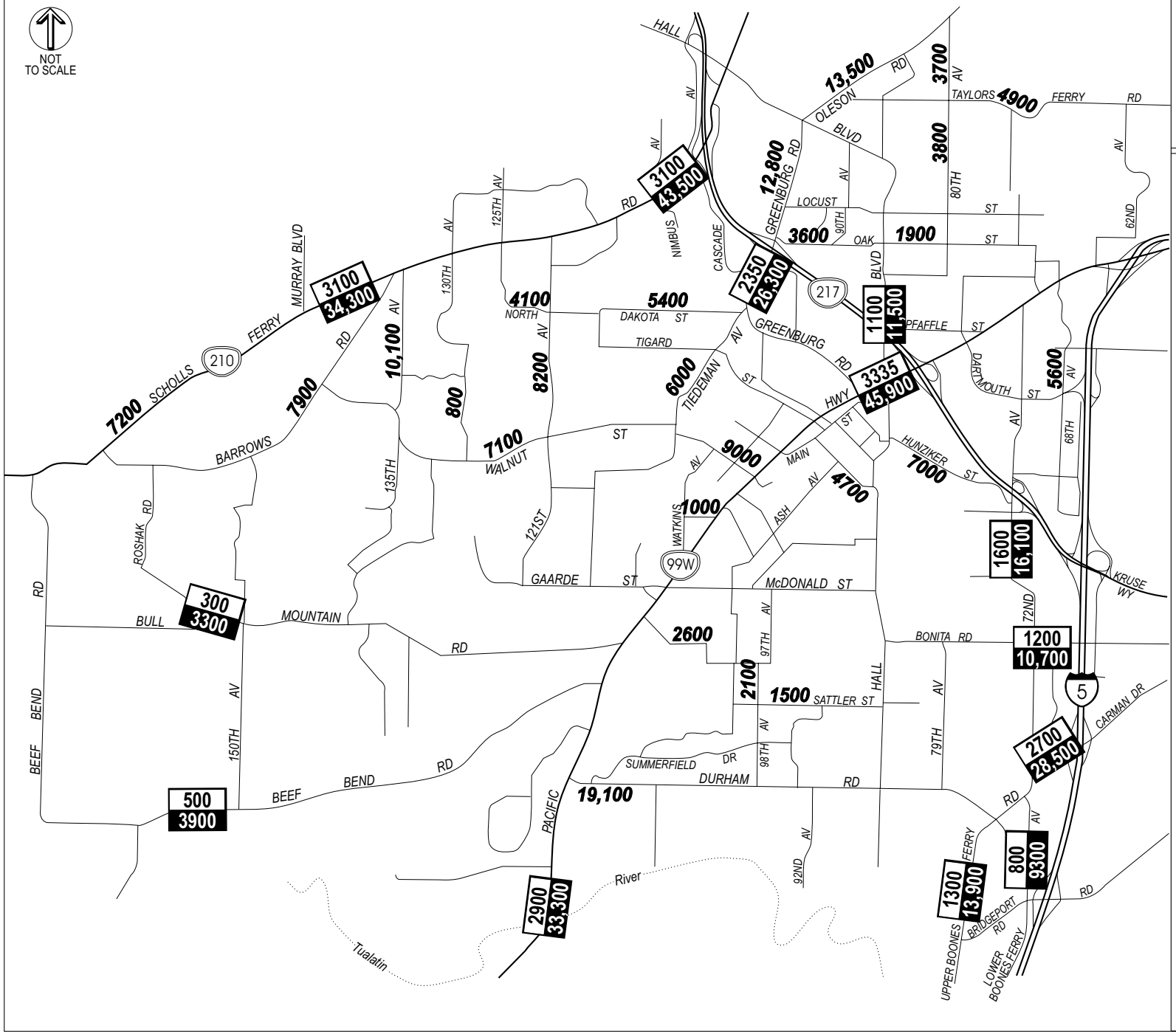

CITY OF TIGARD

Transportation Systems Plan

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0000 - Peak Hour Volume

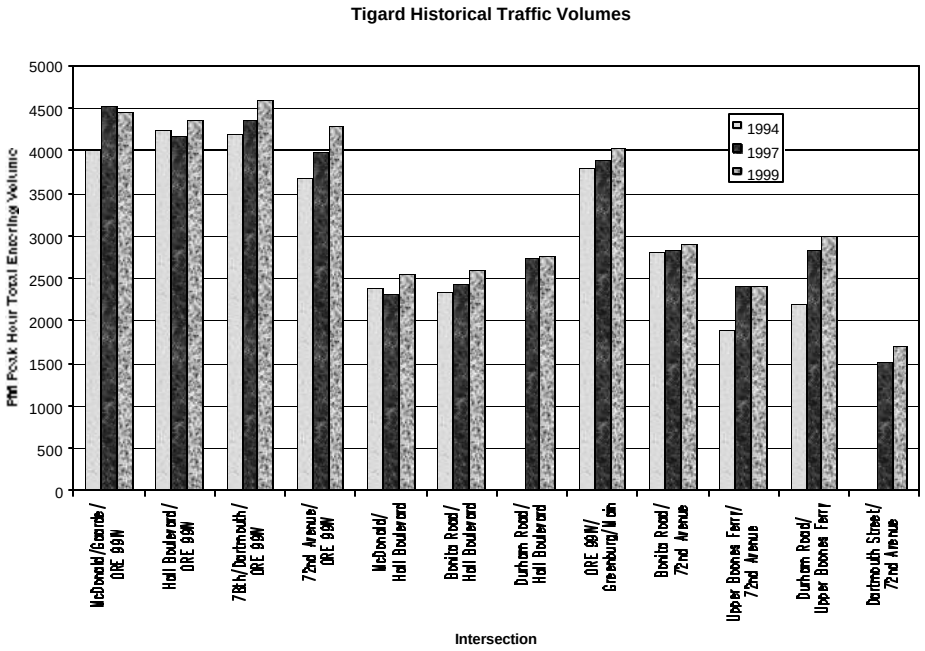
00,000 - ADT Volume

0000 - Daily Volumes from Previous Counts (1993 - 1994)

1999 Traffic Volumes

Street	Peak Hour Volume
Dartmouth Street	1,000
72nd Avenue (south of Dartmouth)	950
Hall Boulevard (north of Durham)	1,375
Durham Road (east of Hall)	2,050
Bonita Road	1,500
McDonald Street	975

Figure 3-5
EXISTING TRAFFIC VOLUMES



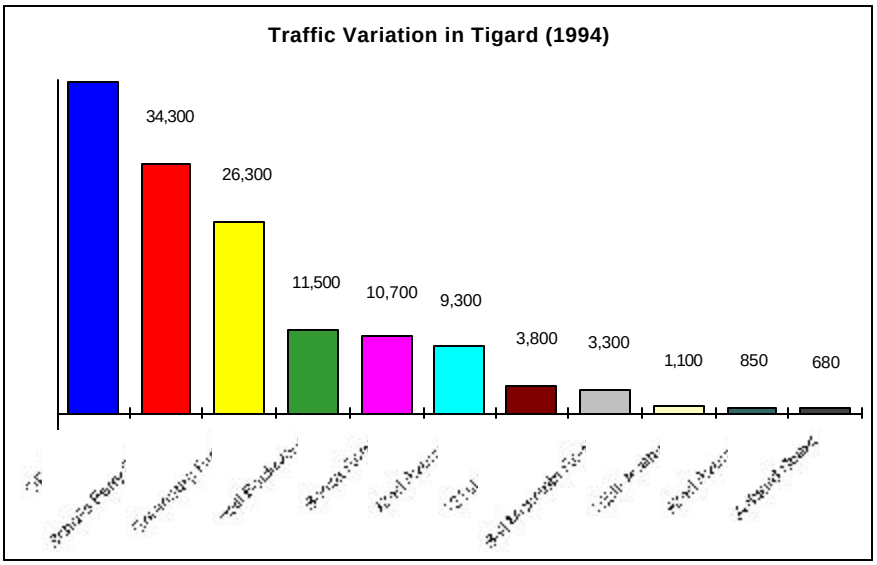


Figure 3-6
Traffic Volume Summaries

Traffic data collected over the course of this study illustrate the typical fluctuations of traffic over the course of a day (Figure 3-7). In particular, Figure 3-7a shows traffic volumes on ORE 99W, both at the south City Limits and near downtown Tigard. This figure demonstrates that morning and evening peak periods have similar characteristics in both locations, but that there is much more midday traffic in downtown than at the south City Limits. In Figure 3-7b, traffic volumes are shown for streets near retail areas of Tigard. These graphs show that traffic volumes generally tend to increase over the course of the day (through the evening peak period). In Figure 3-7c, streets showing typical residential and employment areas are shown. These streets generally tend to peak in the morning and evening peak (commute) hours.

COLLISIONS

Both the regional highway and regional retail facilities in Tigard tend to generate significant traffic incidents to which the police department routinely responds. The following four areas are all regional in nature and have the highest accident rates in the City:

- ORE 99W - In particular, the segment between Hall Boulevard and ORE 217. Many of the accidents are due to access issues or turning traffic (many driveways).

- ORE 217 - In particular, the segment between ORE 99W and I-5. Many of the problems here are related to merging traffic and rear-end accidents the end of the traffic queue.

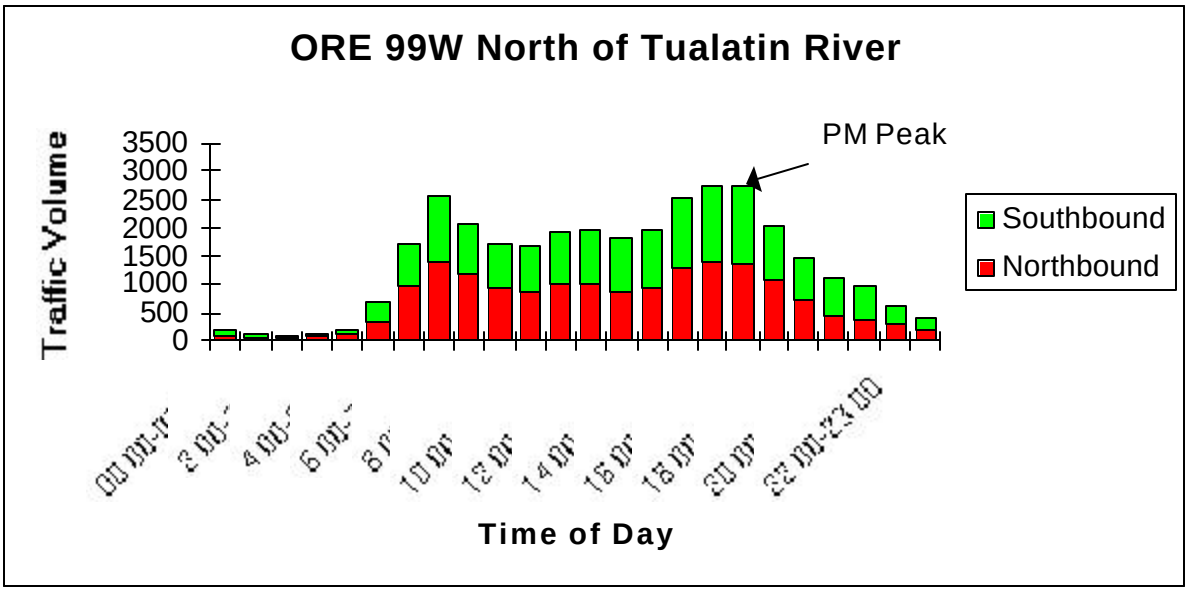
- Washington Square - In particular, on Greenburg Road between Locust Street and the ORE 217 ramps due to the large volume of vehicles, weaving and turning vehicles. The large number of people from outside the area traveling to shopping areas increases the number of system users who are not familiar with the circulation.

- Tigard Triangle (bounded by ORE 99W, I-5, ORE 217) - This is developing as a regional retail center, thereby increasing vehicle trips in the area. It is now experiencing similar "out of area" drivers to the Washington Square area. The accident rate has increased by 50 percent in the last two years.[4]

Recent accident data on state highways in Tigard was obtained from ODOT. This data indicates the following:

Route	*1996*	*1997*	*1998*	*Total (1996-1998)*
ORE 99W	323	276	284	883
I-5	47	57	71	175
Hall Boulevard	87	93	115	295
Scholls Ferry Road	9	32	22	63
ORE 217	165	141	132	438

[4] Per meeting with Tigard Police Chief Ron Goodpaster, February 14, 1995.



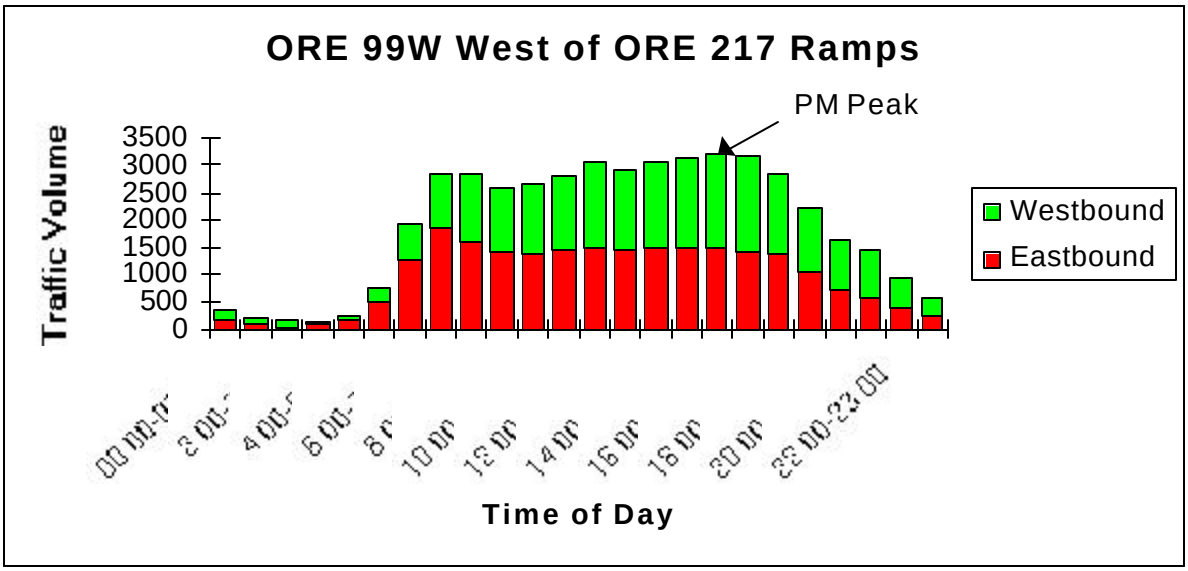
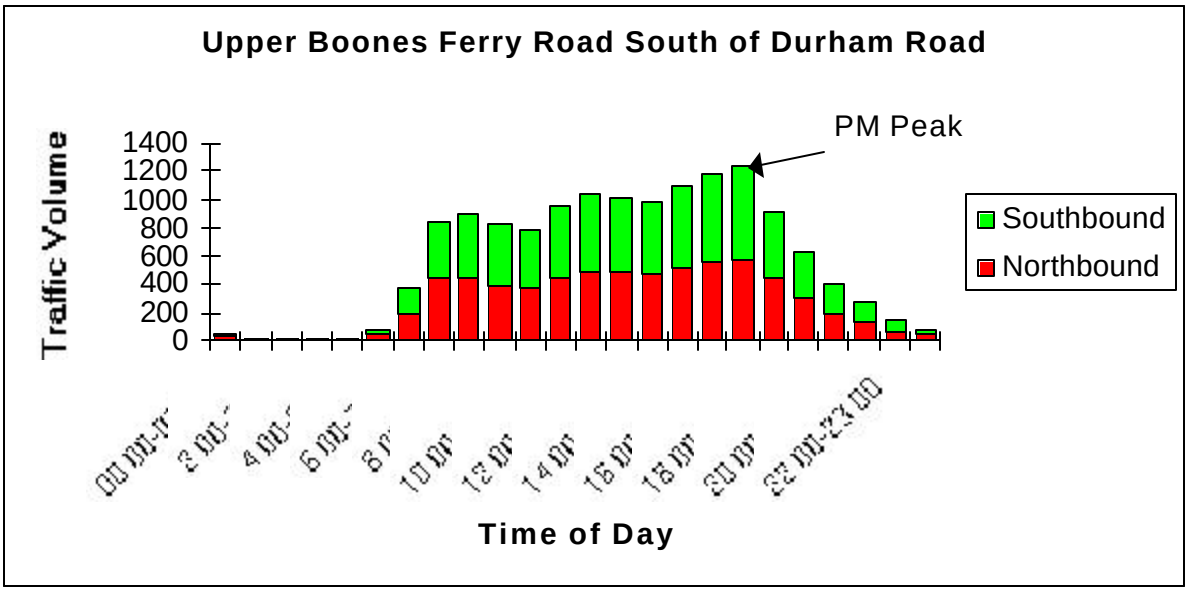


Figure 3-7a
ORE 99W (Hourly Traffic Variation in Tigard)



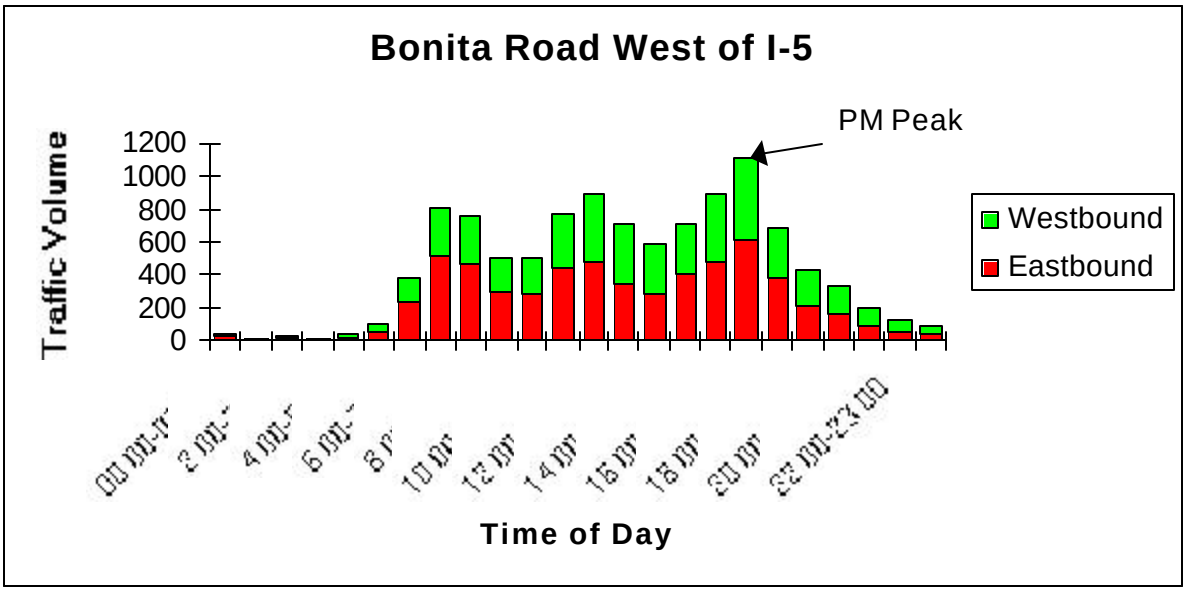
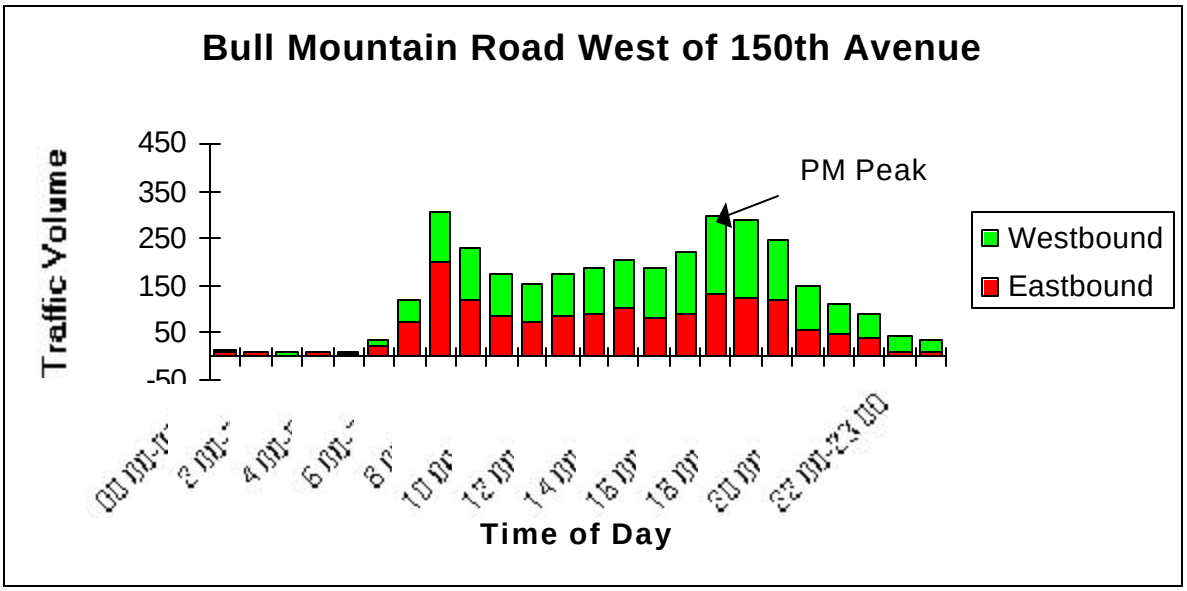


Figure 3-7b
Retail Areas (Hourly Traffic Variation in Tigard)



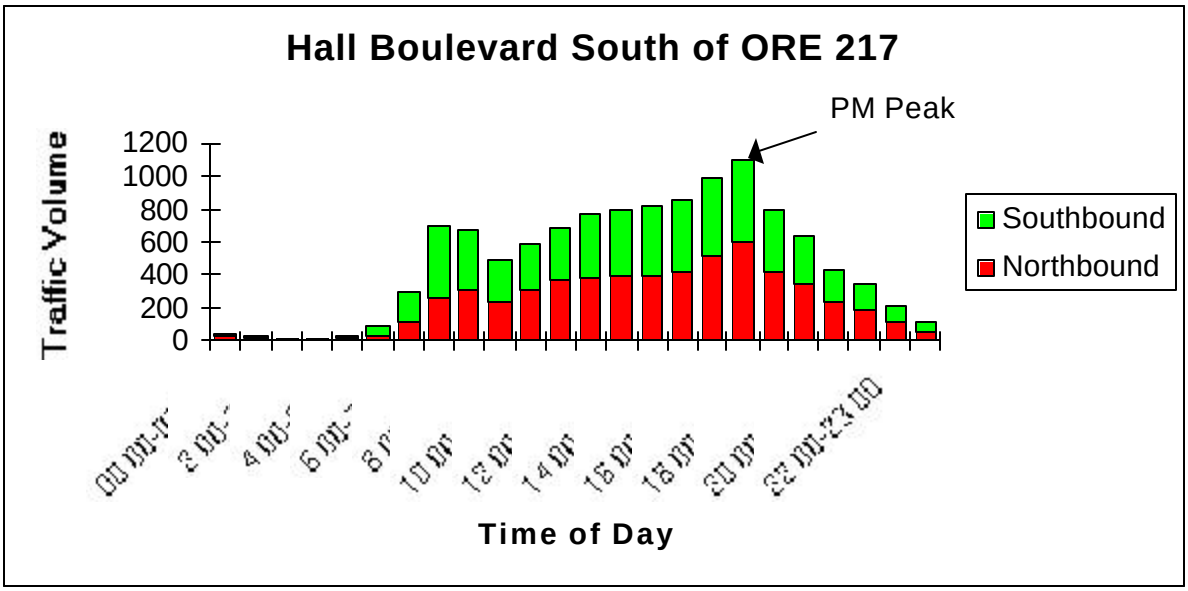


Figure 3-7c
Residential and Employment Areas (Hourly Traffic Variation in Tigard)

Washington County maintains a safety priority index system (SPIS) listing that ranks the high accident locations county-wide. SPIS number and rank are based upon the number, rate and severity of accidents at a particular location. The 1997-1999 is the most current listing. Table 3-1 lists the existing hazard locations as defined by the SPIS value for locations in Tigard for the last three SPIS periods (1994-1996, 1996-1998 and 1997-1999). Fourteen intersections have SPIS values above the threshold identifying existing hazard locations for the 1997-1999 listing produced by Washington County.

Table 3-1
Washington County SPIS Listing
1997-1999

RANK	type	LOCATION	INTERSECTING ROAD	ADT	**SPIS**	**#ACC**
9	co/city	Nimbus Ave/Dr	Scholls Ferry Rd	57877	**99.42**	50
33	co/state	Bull Mountain Rd	Highway 99w	45568	**71.15**	51
36	co/state	Beef Bend Rd	Highway 99w	45460	**69.06**	20
52	co/city	Boones Bend Dr/121st Ave	Scholls Ferry Rd	36158	**60.39**	30
74	co/city	Barrows Road (E)	Scholls Ferry Rd	31305	**50.40**	19
77	co/city	135th Avenue	Scholls Ferry Rd	30654	**49.74**	28
92	co/city	Greenburg Rd	Locust Street	15358	**46.48**	15
94	co/state	Greenberg/Oleson	Hall Blvd	34761	**45.03**	35
139	co/city	North Dakota St/125th Ave	Scholls Ferry Rd	34907	**37.08**	31
143	co/city	Conestoga Drive	Scholls Ferry Rd	38496	**36.31**	17
185	co/city	Taylors Ferry Rd	70th Ave	5957	**29.96**	3
191	co/state	Oak Street	Hall Blvd	16338	**29.45**	10
208	co/state	Locust Street	Hall Blvd	15195	**27.82**	11
218	co/city	130th Avenue	Scholls Ferry Rd	34773	**26.92**	10

SPIS Listing 1996-1998

RANK	type	LOCATION	INTERSECTING ROAD	ADT	**SPIS**	**#ACC**
3	co/state	Hall Blvd	Scholls Ferry Rd	45790	**141.95**	92
10	co/city	Nimbus Ave/Dr	Scholls Ferry Rd	52239	**105.59**	53
31	co/state	Beef Bend Rd	Highway 099w	45460	**74.69**	22
34	co/state	Bull Mountain Rd	Highway 099w	45840	**73.00**	52
38	co/city	Boones Bend Dr/121st Ave	Scholls Ferry Rd	36158	**68.80**	35
48	co/city	Scholls Ferry Rd	135th Ave	30654	**65.79**	30
84	co/state	Greenburg Rd/Oleson Rd	Hall Blvd	34761	**51.36**	39
124	co/state	Garland Rd	Highway 099W	34200	**41.33**	3
142	co/state	Fischer Rd	Highway 099w	38825	**37.42**	24
155	co/city	North Dakota St/125th Ave	Scholls Ferry Rd	34907	**35.55**	28
159	co/co	Old Scholls Ferry Rd (092 Ave)	Scholls Ferry Rd	16462	**35.00**	18
171	co/co	Beef Bend Rd	Bull Mountain Rd	12128	**33.47**	11
173	co/co	Old Scholls Ferry Rd	092nd Ave	620	**33.39**	4
184	co/city	Walnut St	124th Ave	9618	**32.06**	4
192	co/state	Boones Ferry Rd	Bridgeport Rd	23155	**31.25**	6
203	co/co	Scholls Ferry Rd	Scholls Sherwood Rd	8780	**30.17**	3
206	co/state	Hall Blvd	Locust St	15195	**29.32**	11
221	co/city	Scholls Ferry Rd	Springwood Dr	46757	**27.76**	10
249	co/city	Scholls Ferry Rd	130th Ave	34773	**24.52**	9

252	co/state	Hall Blvd	Oak St	16338	**24.23**	8
261	co/co	Walnut St	121st Ave	17165	**23.24**	10
262	co/co	Cedarcrest St	080th Ave	5295	**23.24**	5
264	co/city	Bridgeport Rd/Lwr Boones	072nd Ave	37023	**23.10**	11
267	co/city	Greenburg Rd	Mapleleaf St/WashSq Dr	24645	**22.83**	11
271	co/co	Beef Bend Rd	Elsner Rd	6710	**22.37**	6
288	co/city	Greenburg Rd	Locust St	14035	**20.71**	11
291	co/co	Barrows Rd	Roshak Rd	7108	**20.57**	6
339	co/co	Elsner Rd	Scholls Sherwood Rd	9315	**17.56**	5
342	co/co	Taylors Ferry Rd	080th Ave	10665	**17.17**	7
388	co/co	Scholls Ferry Rd	175th Ave	13375	**14.79**	5
400	co/co	Locust St	080th Ave	7445	**14.17**	3
427	co/co	Old Scholls Ferry Rd (GC)	Scholls Ferry Rd	16144	**12.64**	4
481	co/city	Walnut St	132nd Ave	11484	**9.98**	3
483	co/state	Highway 099w	Pacific Dr (s)	35782	**9.79**	3

Washington County SPIS Listing
1994-1996

						3 YEAR TOTALS					
TYPE	LOCATION	INTERSECTING ROAD	ADT	SPIS	RANK	#ACC	#VEH	F	A	B	C
co/state	Hall Blvd	Scholls Ferry Rd	44690	**56.48**	12	61	130	0	0	7	37
co/city	Nimbus Dr	Scholls Ferry Rd	41990	**47.57**	35	40	84	0	1	1	28
co/co	Beef Bend Rd	Scholls Ferry Rd	14495	**46.73**	42	21	39	0	3	5	4
co/city	Boones Bend Dr/121st Ave	Scholls Ferry Rd	36158	**45.81**	45	27	51	1	2	4	13
co/city	135th Ave	Scholls Ferry Rd	30654	**44.66**	54	25	53	0	3	2	9
co/city	Barrows Rd	Scholls Ferry Rd	15600	**43.53**	65	18	39	0	0	0	11
co/state	Bull Mountain Rd	Hwy 99W	41790	**42.93**	73	32	72	0	0	4	19
co/city	North Dakota St/125th Ave	Scholls Ferry Rd	34907	**42.55**	79	22	48	1	2	1	10
co/city	Greenburg Rd	Locust St	10690	**42.27**	83	11	23	0	1	2	1
co/co	Walnut St	121st Ave	14950	**41.48**	89	15	31	0	0	2	10
co/city	Greenburg Rd	Mapleleaf St/WashSq Dr	24645	**39.85**	104	21	43	0	0	1	10
co/co	Beef Bend Rd	Bull Mtn Rd	7320	**38.15**	122	9	19	0	0	3	11
co/state	Greenburg Rd/Oleson Rd	Hall Blvd	25650	**35.39**	155	16	35	0	0	2	10
co/co	Locust St	72nd Ave	2506	**34.83**	163	3	6	0	0	0	2
co/co	Locust St	80th Ave	7445	**32.75**	189	4	8	0	0	4	0
co/state	Beef Bend Rd	Hwy 99W	40260	**32.54**	193	16	33	0	0	5	9

Source: Washington County. R&O 86-95 defines determines existing hazard locations to be SPIS greater than 32.24.
Key: SPIS = Safety Priority Index System, ADT = Average Daily Traffic, Rank = ranking of Countywide SPIS, #Acc = total collisions, #veh = total vehicles, F = fatalities, A = severe injuries, B = moderate injuries, C = minor injuries

SCHOOLS

There are a number of schools in Tigard where the surrounding roadways create barriers for access due to limited width and pedestrian facilities. In conversations with the Tigard-Tualatin School District, the following issues were noted by school site:[5]

- Metzger Elementary: Adequacy of walking paths and adjacent street width
- Mary Woodword School: Difficult for traffic circulation due to congestion
- Fowler Intermediate School: Access from both Walnut Street and Tiedeman Avenue
- Durham Elementary School: Adequacy of Durham Road width, walking paths, turn lanes
- Tigard High School: Driveway spacing conflicts
- Templeton Elementary School: Adequacy of sidewalks

TRAFFIC CONTROL

Tigard has 66 signalized intersections, with the majority on arterial streets. A summary of the ownership of these signals as well as who operates and maintains them is shown in Table 3-2. There are five key coordinated systems within the City. These include:

- ORE 99W
- 72nd Avenue between ORE 217 southbound ramps and Hampton Street
- Scholls Ferry Road
- Greenburg Road between ORE 217 southbound ramps and Locust Street
- 72nd Avenue between ORE 217 southbound ramps and Hampton Street

Of the 66 signals in the City of Tigard, 11 are owned by the City of Tigard, 11 are owned by Washington County and 44 are owned by ODOT. Most signals do not need upgrade or modernization. The signal at Main Street/Scoffins Street is the oldest in the City and would be the most likely candidate for upgrade. The signal at 72nd Avenue/Bonita Road has recently been upgraded to include protective/permissive left turn phasing on all approaches. The signals at Durham/Upper Boones Ferry Road, 72nd Avenue/Boones Ferry Road and 72nd Avenue/Carman Drive should eventually be intertied.

Figure 3-8 shows the signalized locations. Traffic signals are valuable devices for the control of vehicle and pedestrian traffic. Traffic control signals, properly located and operated, can have one or more of the following advantages:

- They provide for the orderly movement of traffic
- Where proper physical layouts and control measures are used, they can increase the traffic handling capacity of the intersection

[5] Per conversation with Dr. Joki, Superintendent, Tigard-Tualatin School District, February 22, 1995.

- They reduce the frequency of certain types of accidents, especially right angle type
- Under favorable conditions, they can be coordinated to provide continuous or nearly continuous movement of traffic at a definite speed along a given route
- They permit minor street traffic, vehicular or pedestrian, to enter or cross continuous traffic on the major street
- Improper or unwarranted signal installations may cause:
    - Excessive delay
    - Disobedience of signal indications
    - Circuitous travel of alternative routes
    - Increased accident frequency, particularly rear-end type

Consequently, it is important that the consideration of a signal installation and the selection of equipment be preceded by a thorough study and be based on consistent criteria. The study must identify the need for left turn phasing, lanes and phase type. The justification for the installation of a traffic signal at an intersection should be based upon the warrants stated in *the Manual on Uniform Traffic Control Devices*[6] (MUTCD). The MUTCD has been adopted by the state of Oregon and is used throughout the nation.

The same conditions hold true for installation of stop sign traffic controls. Specific warrants identify conditions which may warrant two-way or multi-way stop sign installations. A stop sign is not a cure-all and is not a substitute for other traffic control devices. Guidelines and warrants for stop sign installations are outlined in the MUTCD.

[6] *Manual on Uniform Traffic Control Devices for Streets and Highways*, US Department of Transportation, Federal Highway Administration, 1988, pages 4C1-4C12.

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CITY OF TIGARD

Transportation Systems Plan

Legend

- Signalized Intersection

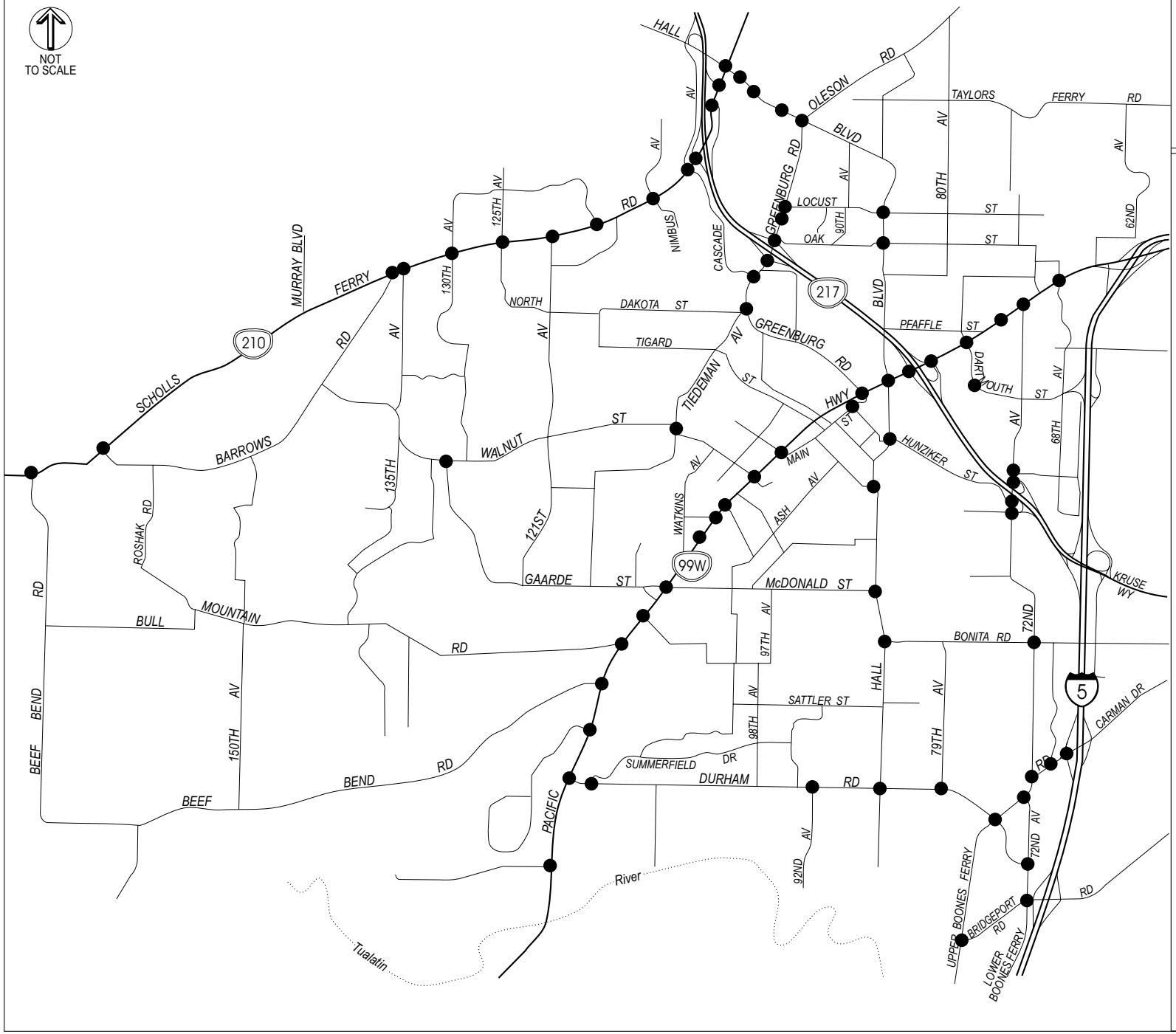


Figure 3-8
SIGNALIZED INTERSECTIONS

Table 3-2
Tigard Signal System

Intersection	Ownership	Agency Operating	Agency Mainaining
Scholls Ferry Road			
Barrows Road (West)	WA County	WA County	WA County
Barrows Road (East)	WA County	WA County	Beaverton
Murray Boulevard	WA County	WA County	Beaverton
130th Avenue	WA County	WA County	Beaverton
125th Avenue	WA County	WA County	Beaverton
121st Avenue	WA County	WA County	Beaverton
Conestoga Drive	WA County	WA County	Beaverton
Nimbus Avenue	WA County	WA County	Beaverton
Cascade Avenue	ODOT	Beaverton	Beaverton
ORE 217 SB Ramps	ODOT	Beaverton	Beaverton
ORE 217 NB On/WA Square	ODOT	Beaverton	Beaverton
Hall Boulevard	ODOT	Beaverton	Beaverton
Hall Boulevard			
Scholls Ferry Road	ODOT	Beaverton	Beaverton
Embassy Suites Driveway	ODOT	ODOT	ODOT
Target Driveway	ODOT	ODOT	ODOT
Circuit City/US Bank Dwys	ODOT	ODOT	ODOT
Greenburg Road/Oleson Road	ODOT	ODOT	ODOT
Locust Street	ODOT	ODOT	ODOT
Oak Street	ODOT	ODOT	ODOT
ORE 99W	ODOT	ODOT	ODOT
Hunziker Street	ODOT	ODOT	ODOT
Burnham Street	ODOT	ODOT	ODOT
McDonald Street	ODOT	ODOT	ODOT
Bonita Road	ODOT	ODOT	ODOT
Durham Road	ODOT	ODOT	ODOT
Durham Road			
ORE 99W	ODOT	ODOT	ODOT
Summerfield Drive	Tigard	Tigard	WA County
92nd Avenue	Tigard	Tigard	WA County
Hall Boulevard	ODOT	ODOT	ODOT
Upper Boones Ferry Road	ODOT	ODOT	ODOT
72nd Avenue	Tigard	Tigard	WA County
72nd Avenue			
Durham Road	Tigard	Tigard	WA County
Upper Boones Ferry Road	Tigard	Tigard	WA County
Carman Drive	Tigard	Tigard	WA County
Bonita Road	Tigard	Tigard	WA County
Varns /ORE 217 SB Ramps	ODOT	ODOT	ODOT
Hunziker Street	ODOT	ODOT	ODOT
ORE 217 NB Ramps	ODOT	ODOT	ODOT

Intersection	Ownership	Agency Operating	Agency Mainaining
Hampton Street	Tigard	Tigard	WA County
ORE 99W	ODOT	ODOT	ODOT
ORE 99W			
68th Avenue/69th Avenue	ODOT	ODOT	ODOT
72nd Avenue	ODOT	ODOT	ODOT
Tigard Cinemas	ODOT	ODOT	ODOT
Dartmouth Street	ODOT	ODOT	ODOT
ORE 217 NB Ramps	ODOT	ODOT	ODOT
ORE 217 SB Ramps	ODOT	ODOT	ODOT
Hall Boulevard	ODOT	ODOT	ODOT
Greenburg Road	ODOT	ODOT	ODOT
Johnson Street/Main Street	ODOT	ODOT	ODOT
Walnut Place	ODOT	ODOT	ODOT
Garrett Street	ODOT	ODOT	ODOT
Park Street	ODOT	ODOT	ODOT
Tigard Marketplace	ODOT	ODOT	ODOT
Gaarde/McDonald Street	ODOT	ODOT	ODOT
Canterbury Lane	ODOT	ODOT	ODOT
Bull Mountain Road	ODOT	ODOT	ODOT
Beef Bend Road	ODOT	ODOT	ODOT
Royalty Parkway	ODOT	ODOT	ODOT
Durham Road	ODOT	ODOT	ODOT
Fischer Road	ODOT	ODOT	ODOT
Greenburg Road			
ORE 99W	ODOT	ODOT	ODOT
Tiedeman Avenue	Tigard	Tigard	WA County
Cascade Boulevard	Tigard	Tigard	WA County
ORE 217 SB Ramps	ODOT	ODOT	ODOT
ORE 217 NB Ramps	ODOT	ODOT	ODOT
Washington Square Road	WA County	WA County	WA County
Locust Street	WA County	WA County	WA County
Hall Boulevard/Oleson Road	ODOT	ODOT	ODOT
Carman Drive			
I-5 SB Ramps	ODOT	ODOT	ODOT
I-5 NB Ramps	ODOT	ODOT	ODOT
Sequoia Parkway	Tigard	Tigard	WA County
Upper Boones Ferry Road			
Bridgeport Road	ODOT	ODOT	ODOT
Durham Road	ODOT	ODOT	ODOT
Main Street			
Scoffins Street	Tigard	Tigard	WA County

TRAVEL TIME INFORMATION

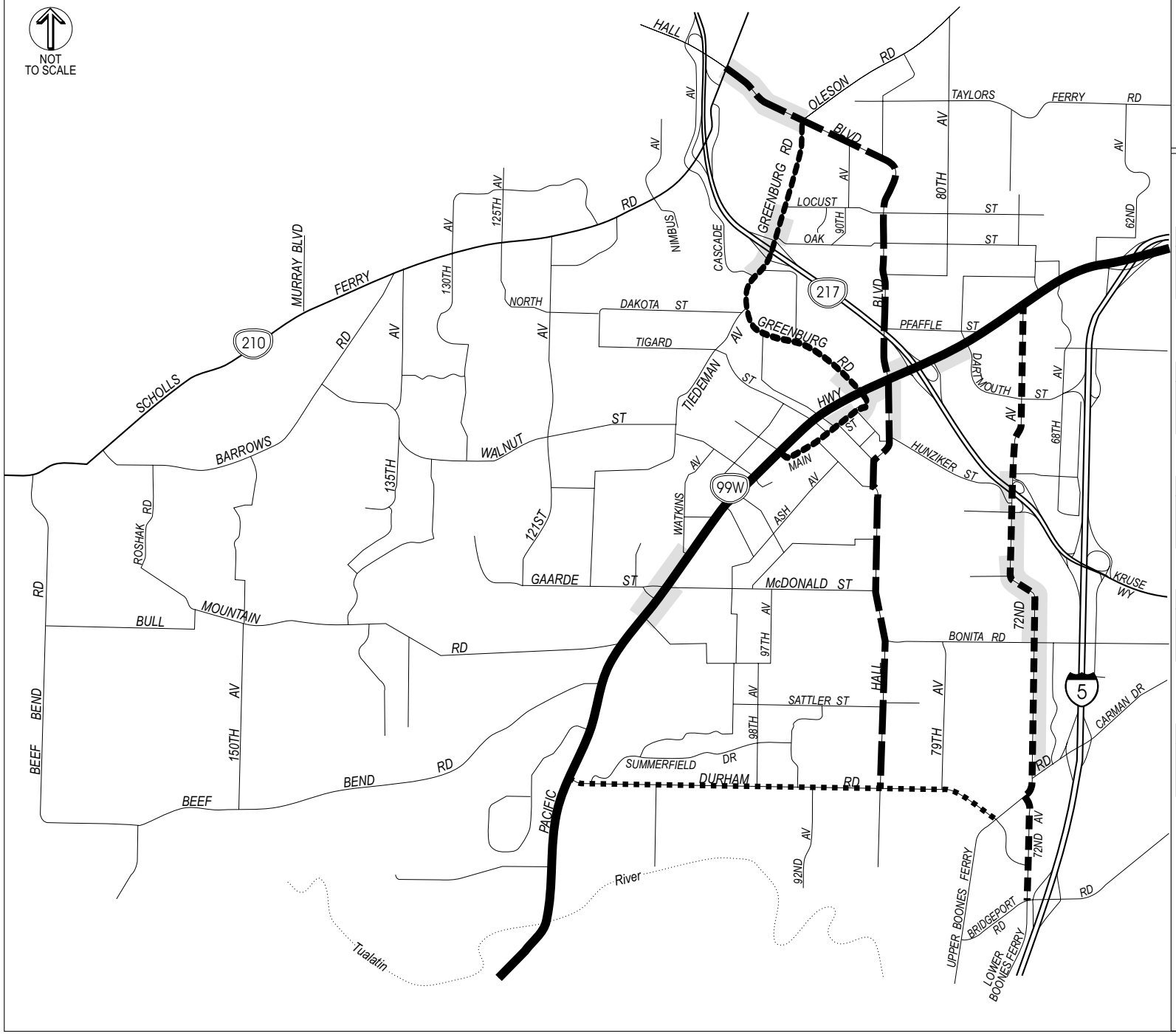
Travel time information was collected to provide a gauge of roadway system performance. Travel time runs were conducted on several key routes in Tigard. These travel time runs measured the length of time it took to travel from a starting point to and end point of each key route (typically, a mile or more in length) during various time periods during the week. The key routes surveyed were ORE 99W, Hall Boulevard, 72nd Avenue, Main Street/Greenburg Road and Durham Road. The time periods observed were weekday morning peak, weekday midday, weekday evening peak and Saturday midday. The most significant delays were generally observed in the PM peak hour. However, on two routes which are heavily influenced by retail activity, delays were significant at other times (ORE 99W Saturday and Greenburg midday). The results of these travel time runs are shown in Figure 3-9. Travel times from various time periods are shown for comparison.

72nd Avenue shows significant delay both northbound and southbound in the PM peak hour. Since 1994, new signal timings were installed at four intersections near ORE 217 and the four intersections linked via interconnect. Delays through these four intersections were initially reduced by more than 40% in both the northbound and southbound directions as a result of this improvement. Since the initial delay reduction a few years ago, the route has attracted additional demand and at least 70-100 additional northbound and about 200-300 additional southbound vehicles now use this route in the evening peak hour, which has increased delays on the route.

Travel time data on ORE 217 indicates that some of the slowest travel speed on the facility occurs in Tigard. Floating car surveys were conducted on ORE 217 during the morning and evening peak periods (see appendix for data summaries). Travel time data were collected along the entire length of ORE 217 at various times through the peak period. The average travel speed for the entire corridor drops to between 30 and 40 miles per hour (mph) during periods of time in both the morning and evening peak representing level of service F conditions for those time segments. Figure 3-10 summarizes the peak travel speeds over the length of ORE 217.

DKS Associates

NOT TO SCALE



CITY OF TIGARD

Transportation Systems Plan

Legend

Hall Boulevard

DIRECTION	MID	PM
N/B	10:26	11:48
S/B	9:04	12:58

72nd Avenue *

		PM	
DIRECTION	MID	Before	After
N/B	7:41	15:37	13:25
S/B	6:42	9:10	8:49

Main St./Greenburg Rd.

DIRECTION	MID	PM
E/B - N/B	10:22	9:22
S/B - W/B	9:35	9:26

Durham Road

DIRECTION	MID	PM	SAT
E/B	4:15	4:21	4:24
W/B	4:25	6:57	4:56

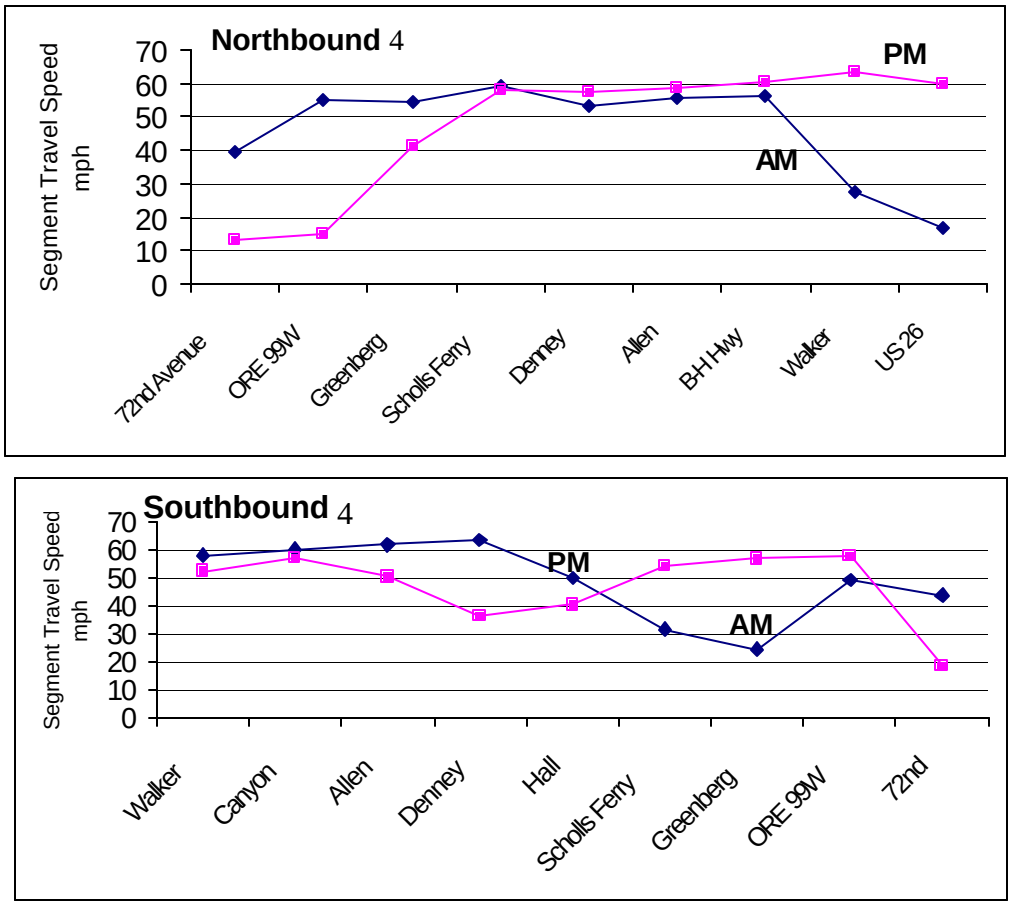
ORE 99W

DIRECTION	MID	PM 1994	PM 1997	SAT
E/B	10:27	13:32	13:47	19:22
W/B	11:12	12:39	15:59	11:25

MID - MIDDAY, 1:00pm - 3:00pm
PM - PM PEAK, 4:00pm - 6:00pm
* - Signal Timing Change 12/94
- Sections with D, E or F - LOS

Figure 3-9
1994
TRAVEL TIME SURVEYS
(Except where Noted)

Figure 3-10
Travel Speed Profiles for ORE 217
April/May 1999
For Critical (slowest) Time Slice



Source: ORE 217 Corridor Study Initial Improvement Concepts Draft, ODOT, February 2000.

TRAFFIC PERFORMANCE ON KEY STREETS

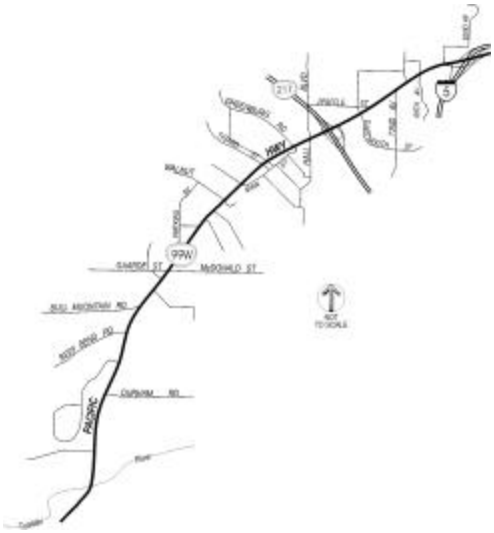
The following sections review the performance of various key routes in Tigard in terms of volumes, capacity, accidents, adjacent land use (including schools), intersection level of service, arterial level of service and general observations. The key routes include ORE 99W, Scholls Ferry Road, Hall Boulevard, Greenburg Road, 72nd Avenue and Durham Road/Boones Ferry Road/Carman Drive. Each route evaluation is organized to provide a description in terms of functional classification, number of lanes, existing traffic volumes, accident locations and a summary of PM peak hour operating conditions. The 1994 calculations were based on the *1985 Highway Capacity Manual.* Since then, the Highway Capacity Manual has been updated twice and the 1997 calculations are based on *the 1994 Highway Capacity Manual* and the 1999 calculations are based on the *1997 Highway Capacity Manual.* While there are some subtle distinctions in the methodologies used, the results produced are comparable.

In general, intersection level of service in Tigard has either remained the same or degraded slightly over the past three years. As regional growth has occurred, traffic volumes around the City have increased. In 1999, most intersections in Tigard operate at level of service D or better, with some exceptions. The intersections which are operating at conditions below level of service D in 1999 are discussed in the following sections.

Travel time runs (which provided the data for the arterial level of service analysis) are shown graphically in Figure 3-9. Areas where arterial level of service is D or worse are identified on these figures. Arterial level of service was calculated according to the *1994 Highway Capacity Manual*.[7] A majority of these runs were conducted in 1994, with updated runs on ORE 99W conducted in 1997. Overall, average evening peak hour travel time along ORE 99W westbound (between 68th Avenue (near I-5) and Fischer Road, west of the City limits) has increased by about three minutes. Travel time in the opposite direction (eastbound) has remained approximately the same. More information on level of service descriptions and calculations (both arterial and intersection) as well as travel time methodology, can be found in the appendix.

ORE 99W

ORE 99W provides regional access to the City of Tigard, but also serves a large percentage of local traffic. ORE 99W connects Tigard with cities to the south and west and eventually to the Oregon Coast. To the east, ORE 99W becomes Barbur Boulevard, a key route in Portland, providing access to downtown Portland. Tigard classifies ORE 99W as an arterial while Washington County and Metro designate it a Major Arterial. ODOT's designation is a Statewide Highway as part of the National Highway System. Portland designates Barbur Boulevard as a regional trafficway.



ORE 99W carries approximately 33,300 vehicles per day (ADT - Average Daily Traffic) near the south Tigard city limits and approximately 45,900 ADT near downtown. ORE 99W is a five lane roadway throughout Tigard. Figure 3-11 shows the percentage of vehicles which are local for various segments.[8] The percentage of local trips on ORE 99W is much higher near downtown Tigard than at either end.

The table below summarizes level of service for a number of signalized intersections along ORE 99W during the weekday evening peak hour. Of the 16 intersections analyzed, all but one intersection performs at level of service D or above. This is generally considered to be acceptable operating performance for a signalized intersection. There are five intersections which operate at level of service D, ORE 99W/Durham Road, ORE 99W/Walnut Street, ORE 99W/Greenburg Road/Main Street, ORE 99W/Hall Boulevard, and ORE 99W/72nd Avenue. If additional traffic is added to these intersections, it is possible that they may decline to an unacceptable level of service. One intersection, ORE 99W/McDonald Street/Gaarde Street,

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7 *1994 Highway Capacity Manual*, Special Report 209, Transportation Research Board, Washington D.C., 1994, Chapter 11.

8 Data provided to the City of Tigard by Metro, December 1992. A plot was generated showing trips on ORE 99W with either an origin or destination in a Tigard traffic analysis zone. This plot was then related to a plot showing all trips on ORE 99W.

currently operates at level of service E. This intersection is already operating at unacceptable levels of service and long queues tend to form on various legs of the intersection. Sometimes these queues extend to other intersections, creating unnecessary operating problems there as well. A long queue (greater than 20 vehicles) forms for about 15-20 minutes in the PM peak hour at the intersection at 68th Parkway/69th Avenue. Over the course of the entire peak hour, this intersection performs acceptably.

It should be noted that the 1997 and 1999 LOS calculations at Hall Boulevard/ORE 99W reflect a lane configuration change in the northbound direction, resulting in a slightly improved level of service over 1994 conditions.

Figure 3-11

PM Peak Hour Intersection Level of Service
Signalized Intersections Along ORE 99W

Signalized Intersections	1994*			1997*			1999*		
	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C
Durham Road	D	27.9	0.77				D	48.7	0.88
Beef Bend Road	B	12.1	0.86	B	11.1	0.80			
Bull Mtn Road	B	8.3	0.67						
Canterbury Lane	B	9.8	0.74						
McDonald/Gaarde	D	33.0	0.93	E	50.5	1.0	E	58.9	1.0
Tigard Mktplace	B	12.4	0.60						
Park Street	A	4.8	0.58						
Walnut Street	D	27.2	0.89	D	31.8	0.95			
Main/Johnson	B	12.6	0.62	B	13.2	0.70			
Greenburg/Main	E	43.1	0.97	D	30.3	0.85	D	43.9	0.85
Hall Boulevard	E	46.3	0.99	D	34.5	0.91	D	49.2	0.87
ORE 217 SB Ramps	C	19.2	0.75	C	21.6	0.83			
ORE 217 NB Ramps	B	5.5	0.65	B	6.5	0.75			
78th Ave/Dartmouth[9]	C	19.7	0.81	C	24.3	0.89	D	35.5	0.86
72nd Avenue[10]	B	14.7	0.75	D	25.6	0.93	C	32.9	0.86
68th/69th Avenues	C	16.0	0.87						

* For analysis purposes the capacity calculation methodology has changed twice over the past six years. The level of service analysis was conducted using the following methodology:

1994 Calculations use 1985 Highway Capacity Manual (HCM) Methodology
1997 Calculations use 1994 HCM Methodology
1999 Calculations use 1997 HCM Methodology

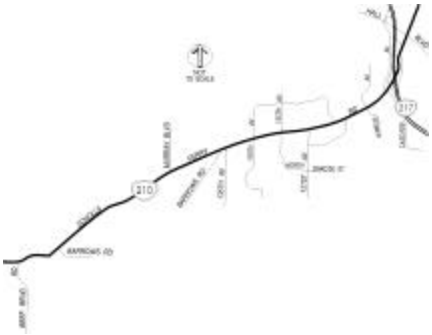
[9] 1994 counts conducted prior to opening of Costco on Dartmouth Street, therefore, counts may be lower than normal.

[10] 1994 counts conducted during Fred Meyer Strike (August, 1994) and may therefore be lower than normal.

The 1994 arterial level of service along ORE 99W tends to mimic that at the signalized intersections. ORE 99W generally flows at a level of service between A and C except in certain areas. These areas generally correspond to areas where intersection level of service is poor. Segments experiencing levels of service D or worse include, ORE 99W northbound between Main Street/Johnson Street and ORE 217 southbound ramps, and southbound from I-5 to 72nd Avenue, from ORE 217 northbound ramps to Hall Boulevard and from Main Street/Johnson Street to Walnut Street. It should be noted that, since ORE 99W is congested between Main Street/Johnson Street and ORE 217, it is unable to deliver as much traffic as is demanded at specific intersections. Because of this, intersection level of service does not appear as poor as arterial level of service, which is more reflective of route (rather than intersection) congestion.

Scholls Ferry Road

Scholls Ferry Road is an east-west roadway that serves as the north city limits for much of Tigard. It is five lanes from Murray Boulevard to Hall Boulevard. It carries approximately 30,000 to 45,000 ADT through Tigard. It has recently been transferred to Washington County, except the portion in the interchange area near ORE 217. It is classified by Metro and Washington an Major Arterial to the west of ORE 217 and as a Minor Arterial to the east of ORE 217. The City of Tigard and Beaverton both classify it as an Arterial for its length within the city limits. Scholls Ferry Road serves local traffic, but also provides regional access to Beaverton, ORE 217 and cities to the west of Tigard.



Arterial level of service was not analyzed for Scholls Ferry Road and intersection level of service was only analyzed for 1999 volumes. Scholls Ferry Road serves as a border between Tigard and Beaverton and is under the jurisdiction of ODOT and Washington County. Although it provides access to Tigard, it is not integral to the internal street network of Tigard.

PM Peak Hour Intersection Level of Service
Signalized Intersections Along Scholls Ferry Road

Signalized Intersections	1999*		
	LOS	Delay	V/C
Beef Bend Road	C	25.5	0.84
Barrows Road (West)	B	8.3	0.54
Murray Boulevard	C	29.8	0.79
Barrows Road (East)	B	15.0	0.57
North Dakota/125th	D	42.9	0.95
Nimbus Avenue	D	47.0	0.98

* 1999 Calculations use 1997 HCM Methodology

Hall Boulevard

Hall Boulevard is a north-south roadway that predominantly serves local Tigard traffic, but also provides access to Beaverton to the north. It is classified by Metro and Washington County as a Minor Arterial and by the City of Tigard and Beaverton as an arterial. ODOT classifies Hall as a District Highway. It carries approximately 12,000 to 23,000 ADT through Tigard. It is generally two lanes, with occasional left turn lanes, from Durham Road to Greenburg Road. It is three lanes between Durham Road and just south of Sattler Street, between ORE 99W and Pfaffle Street and between just north of Spruce Street and just north of Locust Street, and five lanes from Greenburg Road to Scholls Ferry Road. There are 11 traffic signals at intersections on Hall Boulevard. It has many driveways connecting directly to the roadway, serving mostly commercial and residential land uses. A driveway survey was conducted along Hall Boulevard and can be found in the appendix of this report.[11]

The table below summarizes level of service for a number of intersections on Hall Boulevard. Of the seven intersections analyzed, four perform at level of service D. Hall Boulevard/McDonald Street and Hall Boulevard/Durham Road have long queues on some approaches. The queues at Hall Boulevard/McDonald street are on the northbound left and southbound approaches and the queues at the Hall Boulevard/Durham Road intersection are on the southbound and westbound through approaches. These queues generally tend to clear during each signal cycle, but both intersections are virtually at capacity. 1994 arterial level of service along Hall Boulevard shows levels of service C and above are experienced everywhere along Hall Boulevard, except at ORE 99W, where level of service D is experienced both northbound and southbound.

PM Peak Hour Intersection Level of Service
Signalized Intersections Along Hall Boulevard

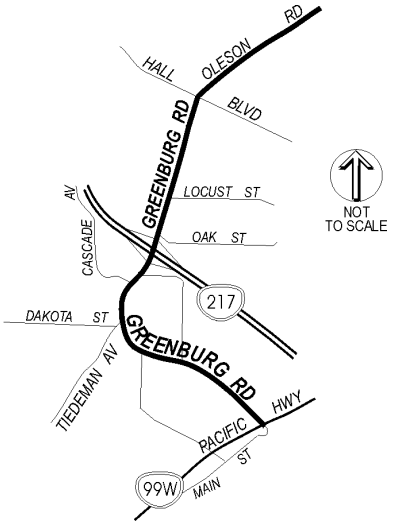
Signalized Intersections	1994*			1997*			1999*		
	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C
Locust Street	B	12.7	0.56	C	19.8	0.86			
ORE 99W	E	46.3	0.99	D	34.5	0.91	D	49.2	0.87
Hunziker Street	B	14.0	0.62						
Burnham Street	B	13.0	0.54						
McDonald Street	C	20.7	0.99	E	52.7	1.0	D	38.0	0.93
Bonita Road	C	16.8	0.68	C	21.0	0.97	D	47.7	0.90
Durham Road	C	24.1	0.83	E	48.1	1.0	D	45.1	0.86

* 1994 Calculations use 1985 Highway Capacity Manual (HCM) Methodology
1997 Calculations use 1994 HCM Methodology
1999 Calculations use 1997 HCM Methodology

[11] Driveway survey, conducted by DKS Associates, September, 1994.

Greenburg Road

Greenburg Road is a north-south street connecting downtown Tigard to the Washington Square area. It provides direct access to both ORE 99W and ORE 217. At Hall Boulevard, Greenburg Road becomes Oleson Road as it proceeds north into Portland.



Greenburg Road, is classified by Metro as a Major Arterial and by Washington County as a Minor Arterial north of ORE 217 and as a Major Collector south of ORE 217. It is classified, for its length, by Tigard as a Major Collector. The City of Portland designates Oleson as a Neighborhood Collector. It is three lanes between ORE 99W and Hall Boulevard, except between ORE 217 and Locust Street and just south of Hall Boulevard where it is five lanes.

The table below summarizes level of service for four signalized intersections on Greenburg Road. Of these four intersections, two operate acceptably at level of service C and the others, Greenburg Road/Main Sreet/ORE 99W and Greenburg Road/Oleson Road/Hall Boulevard operate at level of service D. Long queues form in the eastbound direction on ORE 99W in the PM peak hour, with vehicles waiting through multiple cycles to clear the intersection. Some of this queuing may be caused by unacceptable operating conditions at Hall Boulevard, where the queue spills back to the Greenburg Road/Main Street/ORE 99W intersection.

Arterial level of service along Greenburg Road/Main Street is above level of service C for most of the length of the route. Locations experiencing levels of service D and lower include northbound Main Street between Scoffins and ORE 99W, northbound Greenburg Road between ORE 217 northbound ramps and Washington Square Road, southbound Greenburg Road between Locust Street and Cascade Boulevard and between Center Street and ORE 99W. The arterial level of service on this route is comparable to intersection level of service, especially since arterial level of service near ORE 99W is poor, where the intersection operates at level of service E.

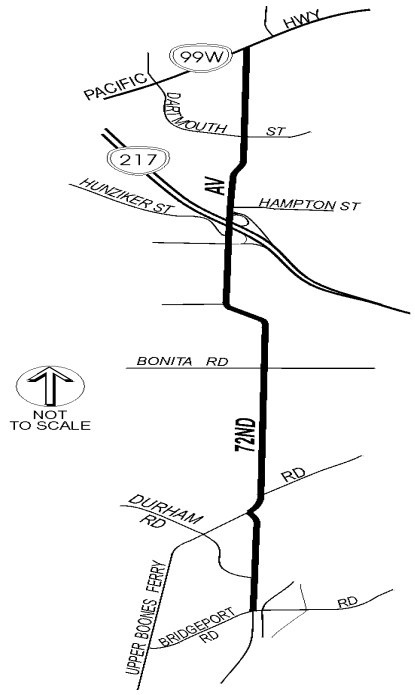
PM Peak Hour Intersection Level of Service
Signalized Intersections Along Greenburg Road

Signalized Intersections	1994*			1997*			1999*		
	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C
ORE 99W/Main	E	43.1	0.97	D	30.3	0.85	D	43.9	0.85
Tiedeman Ave	C	19.0	0.77						
Wash Square Rd				C	23.3	0.73			
Oleson/Hall Blvd				D	34.3	0.95			

* 1994 Calculations use 1985 Highway Capacity Manual (HCM) Methodology
1997 Calculations use 1994 HCM Methodology
1999 Calculations use 1997 HCM Methodology

72nd Avenue

72nd Avenue is a north-south roadway serving mostly local traffic in Tigard. It serves industrial traffic from land uses along its frontages, but also provides connections to ORE 99W, ORE 217, I-5 and Tualatin to the south. It is a three lane roadway between Bridgeport Road and the ORE 217 ramps. North of there, it is a two lane roadway with occasional left turn lanes. 72nd Avenue is classified as a Major Collector by the City of Tigard and as a Minor Arterial by Metro. It is not classified by Washington County. 72nd Avenue carries approximately 16,000 ADT.



The table below summarizes level of service for several signalized intersections on 72nd Avenue. Of the 10 signalized intersections, five perform at level of service C or above (generally considered acceptable operating conditions). The five remaining intersections, 72nd Avenue/ORE 99W, 72nd Avenue/ORE 217 Northbound Ramps, 72nd Avenue/ORE 217 Southbound Ramps/Varns Street, 72nd Avenue/Bonita Road and 72nd Avenue/Carman Drive operate at level of service D. Several of these intersections have been improved in the past few years. 72nd Avenue/Bonita Road was changed from protected left turn phasing on all approaches to protected/permissive phasing on all approaches. 72nd Avenue/ORE 217 Northbound Ramps and 72nd Avenue/ORE 217 Southbound Ramps/Varns Street were part of an overall signal timing/coordination project along 72nd Avenue between Varns Street/ORE 217 Southbound Ramps and Hampton Street. While these intersections operate at a better level of service as a result of these improvements, the 72nd Avenue has become a more desirable route, attracting at least 70-100 additional northbound vehicles and approximately 200-300 additional southbound vehicles between Hampton Street and the ORE 217 Southbound Ramps/Varns Street intersections.

Arterial level of service along 72nd Avenue is poor (level of service D or lower) for a significant portion of its length. In particular level of service is poor northbound from Upper Boones Ferry Road to the ORE 217 southbound ramps. In the southbound direction, level of service is poor between Hampton Street and the ORE 217 southbound ramps, between Sandburg Street and Bonita Road and between Carman Drive and Upper Boones Ferry Road. This is fairly consistent with the intersection operating conditions, which are mostly at level of service D in these areas. In this case, arterial level of service is poor, while intersection level of service may not look so bad since a number of closely spaced signals were not interconnected when the travel time runs were made. Since these signals were not interconnected, additional delay was introduced from uncoordinated signal timing. These signals have since been retimed and the arterial level of service is much improved, however increased traffic volumes create increased delay.

PM Peak Hour Intersection Level of Service
Signalized Intersections Along 72nd Avenue

Signalized Intersections	1994*			1997*			1999*		
	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C
ORE 99W	B	14.7	0.75	D	25.6	0.93			
Hampton Street	B	11.5	0.43						
ORE 217 NB Ramps	B	10.9	0.48	D	29.6	0.99			

Signalized Intersections	1994*			1997*			1999*		
	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C
Hunziker Street	C	16.3	0.84	C	22.7	0.93			
ORE 217 SB/Varns	E	40.7	1.00	D	36.2	0.99			
Bonita Road	E	48.2	0.95	D	37.9	0.89	D	47.7	0.90
Carman Drive	C	24.8	0.79	D	29.4	0.88			
Upper Boones Ferry				B	12.0	0.67	B	17.6	0.65
Durham Road	B	8.7	0.31						
Bridgeport Road	B	12.5	0.54						

* 1994 Calculations use 1985 Highway Capacity Manual (HCM) Methodology
1997 Calculations use 1994 HCM Methodology
1999 Calculations use 1997 HCM Methodology

Durham Road/Boones Ferry Road/Carman Drive

Durham Road is an east-west roadway that serves the southern part of Tigard. It is three lanes for its length. Durham Road is classified by Metro as a Minor Arterial, by Washington County as a study area west of Hall and as a Minor Arterial east of Hall, and as an Arterial by the City of Tigard east of Hall Boulevard. West of Hall Boulevard, it is classified by the City of Tigard as a Major Collector. Lake Oswego designates Carman Drive as a Major Collector. The route provides predominantly local access, but also serves vehicles traveling to ORE 99W or I-5 via Boones Ferry Road and Carman Drive and through traffic between King City and I-5.

The table below summarizes level of service conditions along Durham Road/Boones Ferry Road/Carman Drive. Five of the six intersections perform at level of service D or above. ORE 99W/Durham Road, Hall Boulevard/Durham Road, Upper Boones Ferry Road/Durham Road and I-5 northbound ramps/Carman Drive all operate at level of service D. I-5 southbound ramps/Carman Drive operates at level of service E and is just about at capacity. Queues tend to form westbound and southbound at ORE 99W/Durham Road, with some vehicles waiting through more than one signal cycle. The same is true at Hall Boulevard/Durham Road.

PM Peak Hour Intersection Level of Service
Signalized Intersections on Durham Road

Signalized Intersections	1994*			1997*			1999*		
	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C
ORE 99W	D	27.9	0.77				D	48.7	0.88
Hall Boulevard	C	24.1	0.83	E	48.1	1.0	D	45.1	0.86
Upper Boones Ferry	C	22.0	0.79	D	32.2	0.97	D	52.0	0.98
72nd /Upper Boones				B	12.0	0.67			
I-5 SB/Carman Dr	D	34.2	0.83	E	42.6	1.0			
I-5 NB/Carman Dr	D	25.9	0.89	D	31.5	0.96			

* 1994 Calculations use 1985 Highway Capacity Manual (HCM) Methodology
1997 Calculations use 1994 HCM Methodology
1999 Calculations use 1997 HCM Methodology

Unsignalized Intersections

In addition to the signalized intersections along Tigard's key routes, there are a number of unsignalized intersections which are important to traffic operations in Tigard. The table below summarizes the capacity analysis for evening peak conditions at 11 unsignalized intersections in Tigard. These additional intersections, combined with the signalized intersections mentioned above, represent the key study intersections identified by City staff for analysis in this study.[12] Unsignalized intersections are subject to a separate capacity analysis methodology which is described in the appendix of this report.

Of the 11 unsignalized intersections, six are all-way stop controlled and five have one or more approaches which are uncontrolled. The methodology used for each of these cases is different and results are reported slightly differently (please see Appendix for more detail).

PM Peak Hour Intersection Level of Service
Unsignalized Intersections

Intersection	1994 LOS*	1997 LOS*	1999 LOS*
Walnut Street/135th Avenue	A/A	A/B	
Walnut Street/121st Avenue	C	D	
Walnut/Tiedeman/Fonner	B	D	
Main Street/Burnham Street	A/C		
68th Parkway/Atlanta/Haines	C	D	
72nd Avenue/Dartmouth Street	F	F	D
McDonald Street/97th Avenue	A/B		
68th Avenue/Dartmouth Street		D	
Hall/Sattler/Ross		B/E	
Greenburg Road/Oak Street		B/C	
121st Avenue/North Dakota Street		F	

* 1994 Calculations use 1985 Highway Capacity Manual (HCM) Methodology
1997 and 1999 Calculations use 1994 HCM Methodology

Most of the unsignalized intersections that were analyzed operate acceptably at level of service D or above. However, three intersections are shown as level of service E or F. Often poor levels of service at unsignalized intersections affect only a small number of vehicles, since a majority of the vehicles (on the main street) are uncontrolled and flow freely at level of service A or B.

Other Key Routes in Tigard

Interstate 5 is the west coast's major north-south corridor and it provides regional and interstate access directly to the City of Tigard. I-5 connects Tigard with adjoining cities in the Portland Metropolitan Region as well as with cities further south in Oregon such as Salem and Eugene. I-5 also provides access to other states such as Washington and California. ODOT classifies I-5 as an Interstate Highway as part of the National Highway System. For access management it is designated a Freeway.

[12] Per discussions with Laurie Nicholson, City of Tigard staff, December, 1996 and spring 1999.

ORE 217 provides regional access to the City of Tigard. ORE 217 connects Tigard with Beaverton and Lake Oswego and provides access to US 26 and I-5. US 26 is a major route leading to the Oregon Coast to the west and to eastern Oregon. ODOT classifies ORE 217 as a Statewide Highway as part of the National Highway System. For access management it is designated an Expressway.

Gaarde Street is an east-west Major Collector providing local access to residential streets in Tigard. It is two lanes and, in conjunction with 121st Avenue, connects ORE 99W and Scholls Ferry Road via Walnut Street.

Main Street is an east-west Major Collector serving the commercial downtown core of Tigard. It parallels ORE 99W from Johnson Street to Greenburg Road.

Bull Mountain Road serves residential and rural traffic west of Tigard as a Major Collector. This area is developing rapidly and, besides Beef Bend Road, Bull Mountain Road is one of the only roadways accessing this area. In addition, as ORE 99W becomes more congested, both Bull Mountain Road and Beef Bend Road are becoming part of an alternate route to rural areas to the west of Tigard.

McDonald Street is an east-west Major Collector which runs between Hall Boulevard and ORE 99W. It serves predominantly residential traffic, although, as areas to the west in Tigard develop, it is being used more and more as a cut-through route.

121st Avenue is a north-south Major Collector which runs through mostly residential areas in Tigard. In conjunction with Gaarde Street, it connects Scholls Ferry Road with ORE 99W.

North Dakota Street is an east-west Minor Collector which runs through mostly residential areas in Tigard. It connects Scholls Ferry Road to Greenburg Road and generally runs parallel to Scholls Ferry Road.

Beef Bend Road is parallel to, and south of, Bull Mountain Road. It is classified as a Major Collector and functions in a similar way as Bull Mountain Road as growth occurs in the area to the west of Tigard.

Walnut Street is an east-west Major Collector serving primarily residential traffic in Tigard. In conjunction with 135th Avenue, and with a short jog at Tiedeman Avenue, it provides a connection from ORE 99W to Scholls Ferry Road.

Hunziker Street is an east-west Major Collector connecting Hall Boulevard with 72nd Avenue near the ORE 217 ramps. This street serves both commercial and residential traffic and is increasingly being used as a cut-through route across Tigard.

Dartmouth Street is a relatively new Major Collector in Tigard. It is five lanes at its west end and three at its east end. It serves the new Cub Foods and Costco developments and provides direct access to ORE 99W and I-5.

Bonita Road is an east-west Major Collector which connects Hall Boulevard with Lake Oswego (via Bangy Road) and I-5 (via 72nd Avenue and Carman Drive or via Bangy Road and Kruse Way).

Locust Street is an east-west Major Collector which provides access to local neighborhood streets and between Hall Boulevard and Greenburg Road.

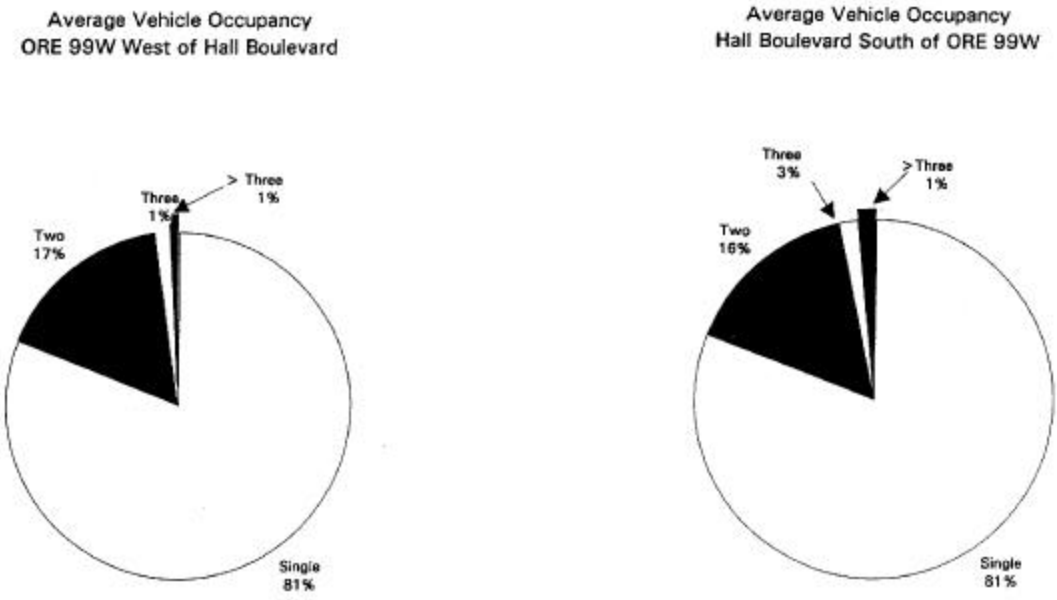
Upper Boones Ferry Road is a north-south Arterial which connects Durham Road with I-5 and Tualatin. Since there is very limited access to Tualatin due to the Tualatin River, much of the traffic between Tigard and Tualatin uses this route.

Taylors Ferry Road is a Major Collector that serves as the northern boundary of the Tigard planning area. This route provides a link between the Metzger area and I-5 and Portland to the east.

AVERAGE VEHICLE OCCUPANCY

Average vehicle occupancy (AVO) was measured at two locations in Tigard.[13] These locations were at **ORE 99W west of Hall Boulevard**, and on **Hall Boulevard south of ORE 99W**. Overall AVO measured in Tigard (between the two locations, over all time periods) was 1.21. This rate is somewhat lower than observed typical ranges for auto occupancy (over all time periods and trip purposes) which range from about 1.31 to 1.54.[14] A breakdown by time period and location is shown in Table 3-3 and the percentage of vehicles by number of passengers and location is shown in Figure 3-12.

Figure 3-12
Average Vehicle Occupancies



[13] Counts conducted for DKS Associates on September 28 through October 6, 1994.

[14] *Calibration and Adjustment of System Planning Models*, U.S. Department of Transportation and Federal Highway Administration, December, 1990, *and Quick-Response Urban Travel Estimation Techniques and Transferable Parameters: User's Guide*, NCHRP Report 187, Transportation Research Board, Washington, D.C., 1978.

Table 3-2
Average Vehicle Occupancy in Tigard

Time	Period	ORE 99W	Hall Blvd	Overall
Weekday				
7:00-9:00 AM	Morning	1.13	1.14	1.13
11:30 AM–1:30 PM	Midday	1.23	1.24	1.23
4:00-6:00 PM	Evening	1.27	1.24	1.26
Overall		**1.21**	**1.21**	**1.21**
Saturday				
1:00-3:00 PM	Midday	1.58	1.54	1.57

ORE 217	Weekday	Northbound	Southbound
7:00-9:00 AM	Morning	1.08	1.08
4:00-6:00 PM	Evening	1.16	1.12

Source: DKS Associates surveys – Tigard Streets 1994, ORE 217 1999.

ACCESS ISSUES

Two major corridors in Tigard are key locations where some form of access management may be applied. These corridors are ORE 99W, which has a significant portion of its frontage occupied by commercial land uses, and Hall Boulevard, which has a large number of access locations for such a major route.

An inventory of driveway conditions along Hall Boulevard was conducted as part of this study. The results of this inventory indicate that access conditions vary greatly along Hall Boulevard. In some segments there are as many as 15 driveways between street intersections. Other segments have as few as zero driveways between street intersections. When adjacent land use was considered, a combination of residential and commercial tended to have the highest number of driveways between streets. A summary of the driveway inventory can be found in the appendix of this report.

LAND USE

Existing land use in Tigard is shown in Figure 3-13. In general, most retail activity in Tigard is located on arterial and major collector roadways.[15] Although residential development is found on arterial and major collector roadways, much of the residential land uses in Tigard generally have access to minor collector or local streets.

The transportation system is most impacted by changes in land use. Trip generation from added land use has and will create needs for new transportation facilities. The most significant changes in land use which have occurred recently are occurring in the area west of Tigard, in the Tigard Triangle and in the southern and western areas of Tigard.

[15] Tigard City Code requires retail development to gain access from arterial or collector streets.

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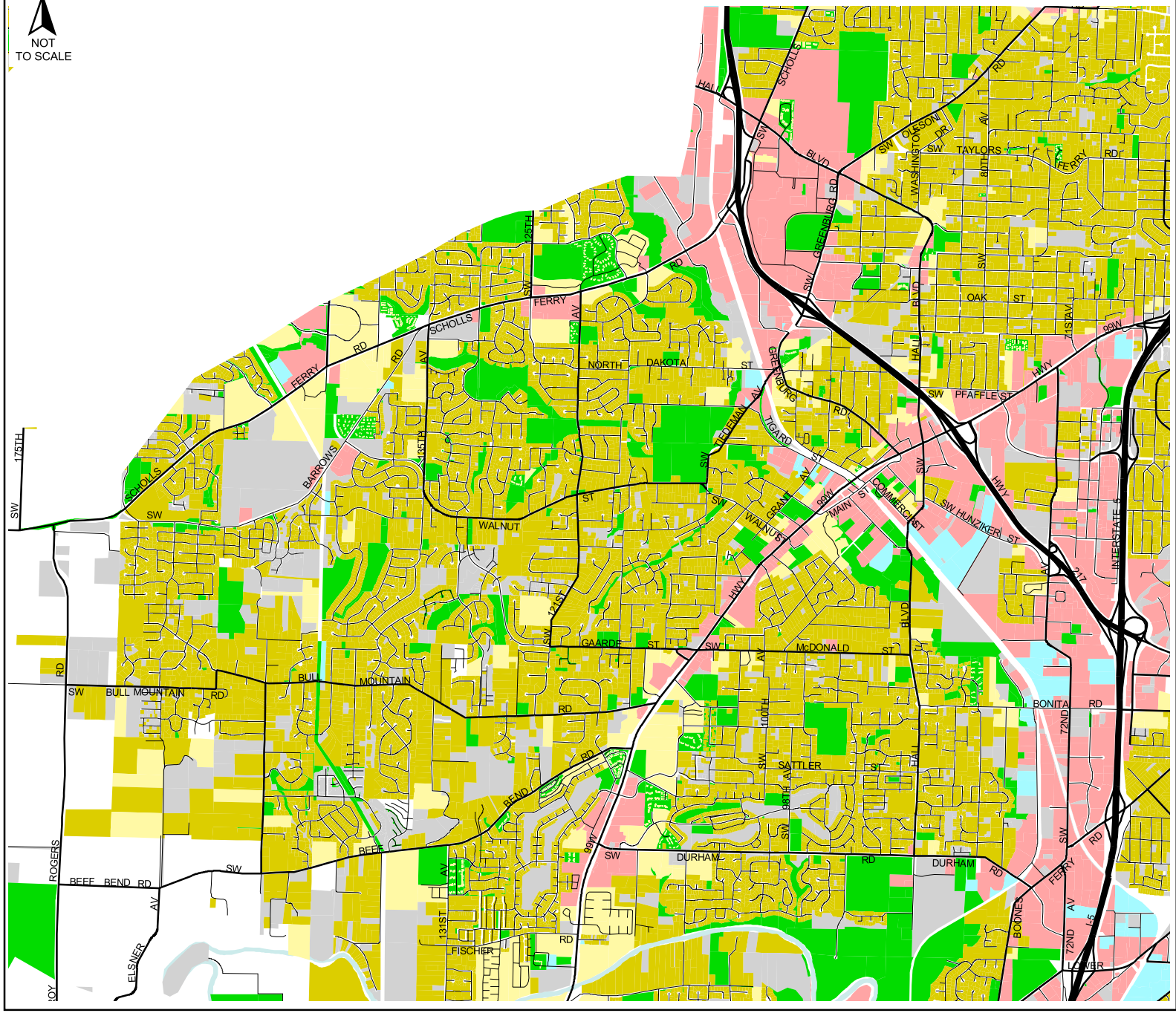

CITY OF TIGARD
OREGON

Transportation Systems Plan

Legend

Existing Land Use

- Commercial
- Industrial
- Multi-Family Residential
- Public
- Single-Family Residential
- Vacant Land

Source: Metro RLIS Database

Figure 3-13
Existing Land Use

TRANSIT

Transit service is provided to the general population of the City of Tigard by Tri-Met. Figure 3-14 shows the routes passing through Tigard. There are two transit centers and two express routes serving Tigard. There are two express routes which have a limited number of stops. Coming from Portland, route 95X stops only at the Tigard Cinemas before it begins making regular stops at Walnut/ORE 99W. Also coming from Portland, route 92X does not stop before reaching the Progress Park & Ride station, where it begins making regular stops. Other routes have stops approximately every 200 feet within Tigard. A comparison of 1990, 1994 and 1999 transit ridership in Tigard is summarized in Table 3-4. No data was available for 1994 for route 38 or for 1990 for route 95. More complete data from 1999 indicates appoximately 9,500 daily transit riders in Tigard[16].

Table 3-4
Daily Transit Ridership in Tigard
1990 , 1994 and 1999

		1990			1994			1999		
Route	**Dir**	**Ons**	**Offs**	**Tot**	**Ons**	**Offs**	**Tot**	**Ons**	**Offs**	**Tot**
12 Barbur	Out	152	683	835	316	941	1257	386	1017	1403
12 Barbur	In	691	160	851	900	254	1154	894	389	1283
38 Boones Ferry	SB	34	33	67				9	37	46
38 Boones Ferry	NB	30	17	47				29	16	45
43 Taylors Ferry	WB	24	110	134	24	127	151	20	158	178
43 Taylors Ferry	EB	109	19	128	109	19	128	148	24	172
44 King City	Out							110	84	194
44 King City	In							19	45	64
45 Garden Home	WB	48	209	257	65	241	306	65	252	317
45 Garden Home	EB	220	47	267	199	66	265	235	71	306
56 Scholls Ferry	SB	1	241	242	3	306	309	3	300	303
56 Scholls Ferry	NB	253	4	257	261	40	301	303	2	305
62 Murray Blvd	EB	24	93	117	43	214	257	94	430	524
62 Murray Blvd	WB	67	24	91	200	58	258	418	107	525
64X Marquam-Tig	Out							4	36	40
64X Marquam-Tig	In							41	1	42
76 Tig-Tual	SB							377	530	907
76 Tig-Tual	NB							552	357	909
78 Beav-LO	SB	224	442	666	275	580	855	252	498	750
78 Beav-LO	NB	434	219	653	562	285	847	419	225	644
92X S. Beav Exp	WB							13	103	116
92X S. Beav Exp	EB							138	10	148
95 Tig I-5 Exp	WB				3	84	87	12	117	129
95 Tig I-5 Exp	EB				64	1	65	104	2	106
							TOTAL	**4645**	**4811**	**9456**

SOURCE: Tri-Met Passenger Census, ons and offs occurring in Tigard.

[16] Route Level Passenger Census, Tri-Met, Spring 1999.

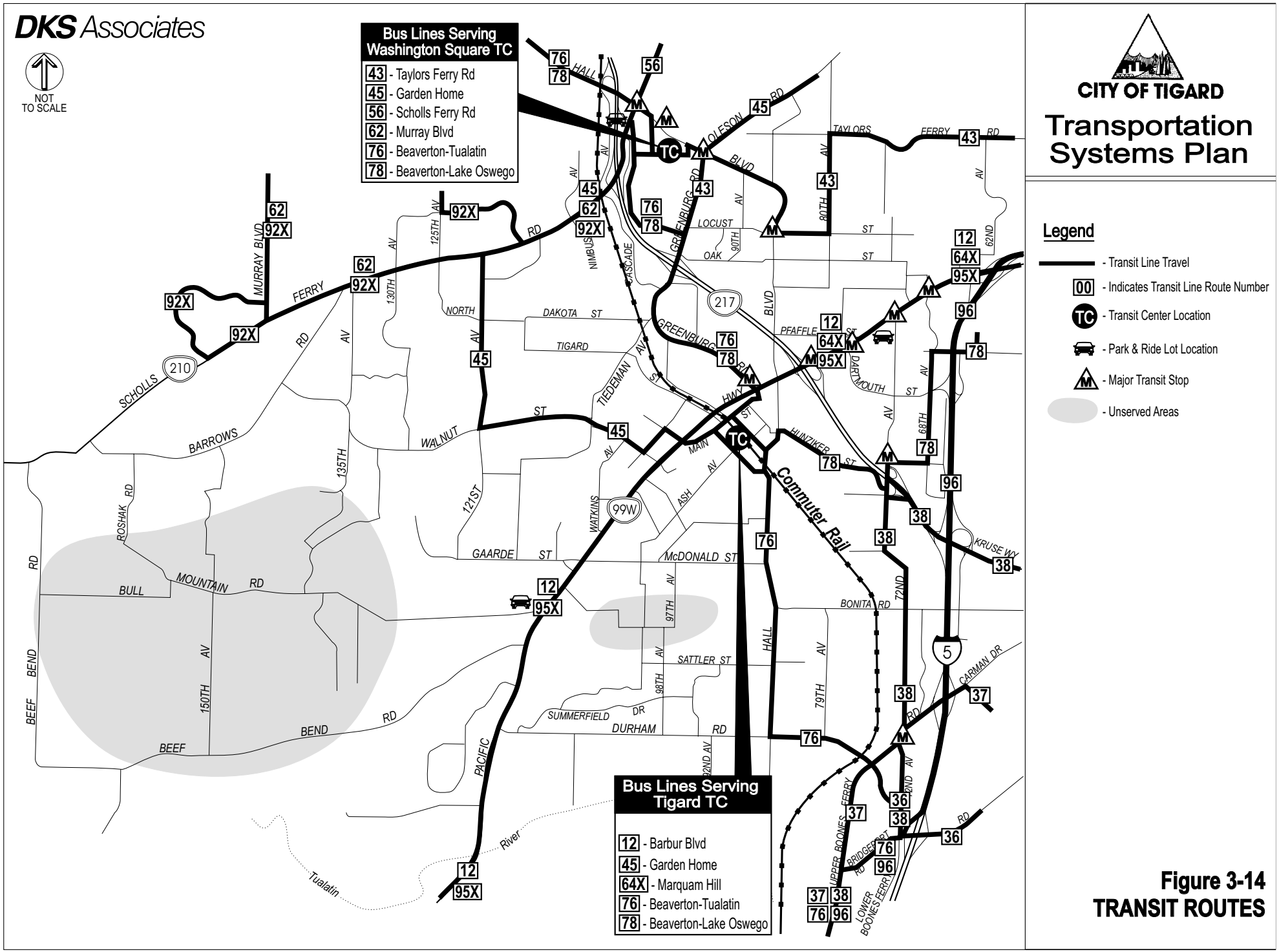

Figure 3-14
TRANSIT ROUTES

BICYCLES

Existing bike lanes and off-street multi-use paths are shown in Figure 3-15. While there is significant inventory of bicycle lanes, most existing lanes are only for short segments. Except for I-5 and ORE 217, bicycles are permitted on all roadways in Tigard. However, because there are few continous and interconnected bikeways in the City, bicycle use is relatively low. Bicycle use in Tigard is generally used for recreational, school and commuting purposes. Bicycle counts at study intersections indicate fewer than 10 bicycle trips at each intersection over a two-hour period of time (either 7-9 AM or 4-6 PM), except at the following intersections, which had between 10 and 15 bicycles in the two hour period:

- Hall Boulevard/McDonald Street (AM peak period)
- Upper Boones Ferry Road/Durham Road (AM and PM peak period)

Metro identifies the following facilities as part of the Regional Bicycle System:

Regional Access	**Regional Corridor (on-street)**	**Community Connector**	**Regional Corridor Off-Street**
• Hall to Greenberg to Main to Hunziker	• Walnut Street • Scholls Ferry Rd • Hall Boulevard • ORE 99W • Hall-Durham-Boones	• 72nd Avenue • Bonita-McDonald • Carman-Durham	• Fanno Creek • Tualatin River • Powerlines • Hunziker to LO through I-5/ORE 217

The adjacent jurisdictions have adopted bicycle maps that provide the opportunity for interconnection between jurisdictions. The Washington County Transportation Plan shows on-street bicycle routes on ORE 99W, Scholls Ferry Road, Hall Boulevard, Greenberg Road, Durham Road, Walnut/Gaarde/McDonald, Oak Street and Locust Street. The County Plan also shows an on-street bicycle route on ORE 217 and I-5 in Tigard (which would be inconsistent with ODOT policy). The powerlines off-street route is the only off-street route shown in Tigard. Using the Transportation Planning Rule criteria, all arterial and collector streets would require bikeways. The City of Portland designates Oleson Road and Barber Boulevard as City Bikeways (which would connect in Tigard to Greenberg Road and ORE 99W). The City of Lake Oswego designates Bonita Road, Carman Drive and Kruse Way as bike lanes or pathways. These routes would link in Tigard to Bonita/McDonald, Carman/Durham and Hunziker (via the ORE 217/I-5 interchange). The City of Beaverton designates Murray Boulevard (which would link to Walnut), Scholls Ferry Road, Barrows Road, 125th Avenue (which would link to North Dakota Street), Nimbus Avenue and Cascade Avenue as bike lanes/bikeways.

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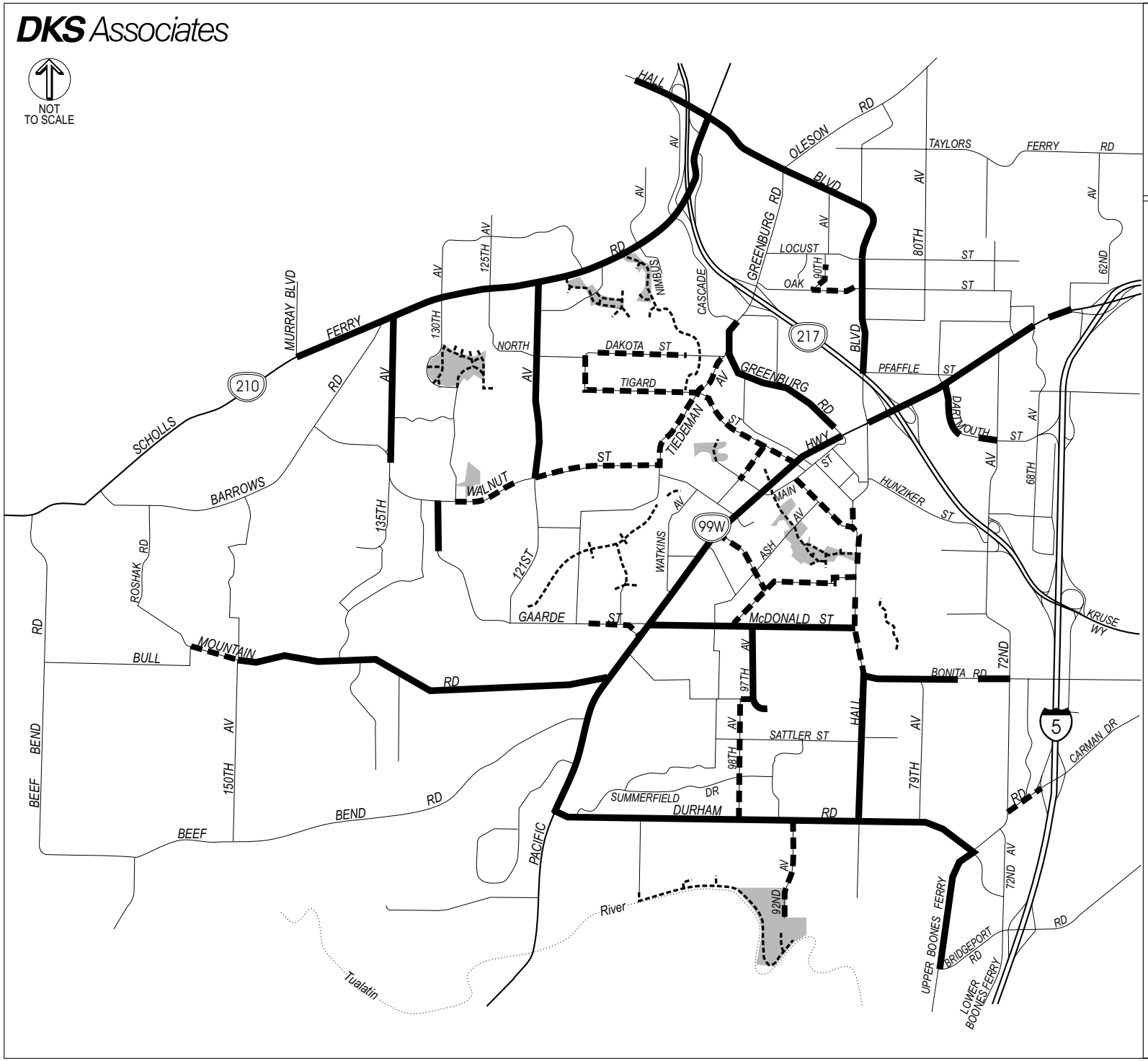

CITY OF TIGARD

Transportation Systems Plan

Legend

- Bike Lanes on One Side of Street
- Bike Lanes on Both Sides of Street
- Off Street Paths
- Parks

Figure 3-15
EXISTING BICYCLE FACILITIES

PEDESTRIANS

Existing sidewalks are shown in Figure 3-16. A majority of arterial and collector streets in Tigard do not have sidewalks on either side of the street. Connectivity and pedestrian linkages are generally fair to poor on the arterial and collector street system. Although sidewalk availability on the arterial and collector system is poor, many residential streets do have sidewalks, especially in areas developed within the past ten to fifteen years.

Pedestrian counts were conducted during the evening peak period (4:00-6:00 PM) at several key intersections in Tigard. A majority of these intersections had fewer than 10 pedestrians in the PM peak hour. However, there were more than 10 pedestrians at many intersections[17], including the following:

- Hall Boulevard/Sattler Street 11 pedestrians
- ORE 217 NB Ramps/ORE 99W 12 pedestrians
- ORE 217 SB Ramps/ORE 99W 13 pedestrians
- 72nd Avenue/Upper Boones Ferry Road 13 pedestrians
- Main Street/Johnson Street/ORE 99W 14 pedestrians
- Hall Boulevard/ORE 99W 15 pedestrians
- Hall Boulevard/Bonita Road 18 pedestrians
- 72nd Avenue/Bonita Road 18 pedestrians
- Dartmouth Street/ORE 99W 19 pedestrians
- Hall Boulevard/Locust Street 21 pedestrians
- Greenburg Road/Washington Square Road 23 pedestrians
- 72nd Avneue/Varns Street/ORE 217 SB 26 pedestrians
- ORE 99W/Gaarde Street 37 pedestrians
- ORE 99W/Walnut Street 50 pedestrians
- ORE 99W/Greenburg Road/Main Street 54 pedestrians

Sidewalks at least five feet wide are required in all new developments and many new local streets do have sidewalks in the City. Metro has classified several routes in Tigard as part of its Regional Pedestrian System[18]:

Transit/Mixed-Use Corridors	**Multi-use Facility with Pedestrian Function**	**Pedestrian Districts**
• ORE 99W	• Fanno Creek	• Washington Square Regional Center
• Hall Boulevard	• Tualatin River	• Tigard Downtown Town Center
• Scholls Ferry Road	• Powerlines	• Murray/Scholls Town Center
• Hunziker Street	• Hunziker to LO	• King City Town Center

[17] Pedestrian volumes represent the number of crossings on all crosswalks combined.
[18] Metro's Regional Pedestrian System map, draft Regional Transportation Plan, 2000.

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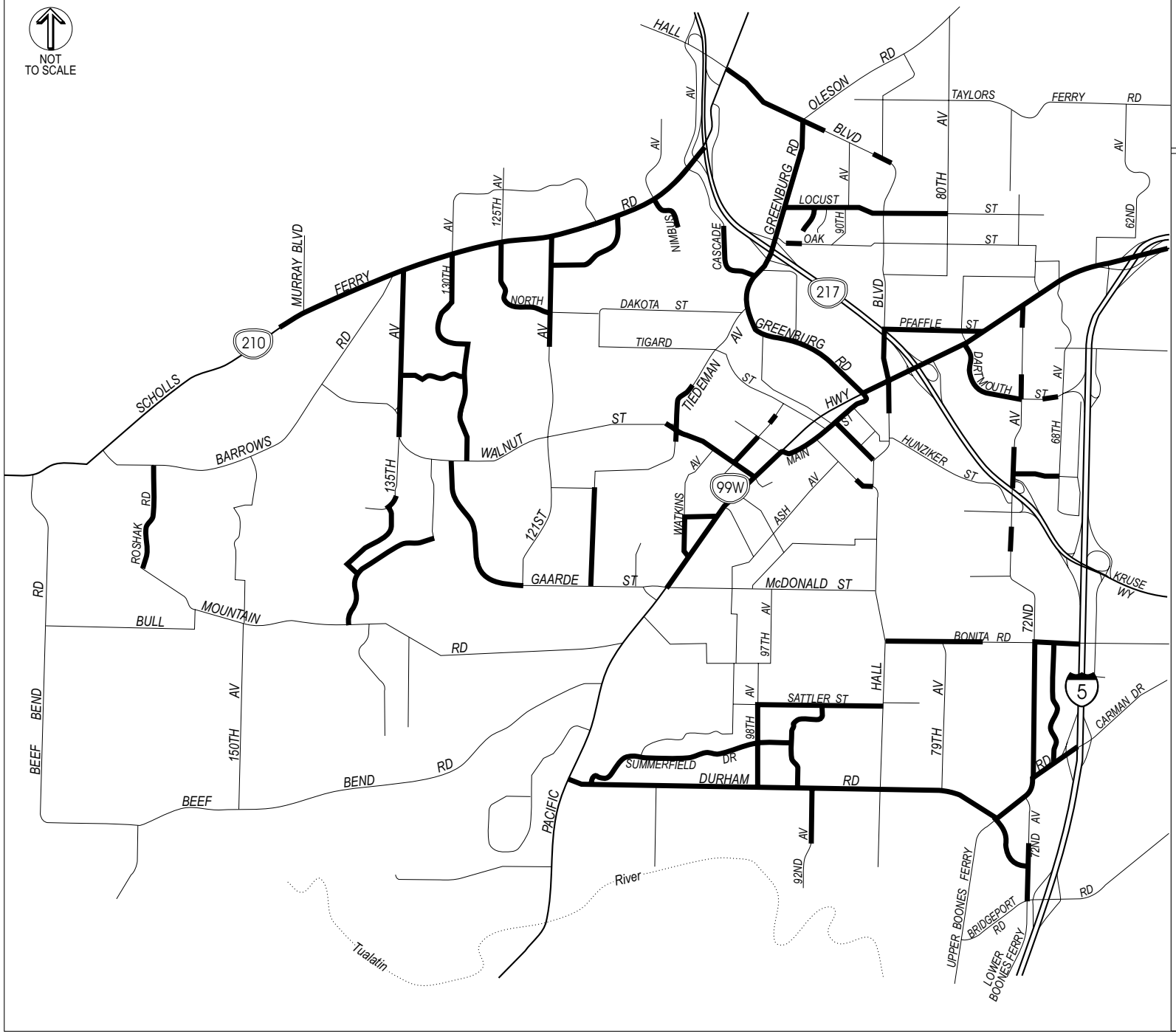

CITY OF TIGARD

Transportation Systems Plan

Legend

- Continuous Sidewalk on at Least One Side of Street

Figure 3-16
EXISTING SIDEWALK FACILITIES

TRUCKS

Principal truck routes in Tigard (as identified by Washington County) include I-5, ORE 217, ORE 99W and some arterial streets. This system provides connections with truck routes serving areas within and outside of Tigard making efficient truck movement and the delivery of raw materials, goods, services and finished products possible. These routes are generally found in and serve areas where there are concentrations of commercial and/or industrial land uses. Figure 3-17 shows truck routes within Tigard. In general, trucks make up about 2-5 percent of the overall traffic at a majority of intersections in Tigard.

RAIL

Railroad tracks traverse Tigard from its northern boundary to the southeast. There are two adjacent but separate tracks south from north of North Dakota Street to Bonita Road. South of Bonita Road, one set of tracks crosses the Tualatin River to Tualatin and the other set of tracks turns east to Lake Oswego. They are both owned by Portland & Western (P&W), a sister company of Willamette & Pacific (W&P) Railroad.

AIR

Tigard is served by the Portland International Airport, located in Northeast Portland on the Columbia River. The Portland International Airport is a major air transportation and freight facility, which serves Oregon and Southwest Washington. It provides a base for over twenty commercial airlines and air freight operations. The Port of Portland reported that 12.6 million passengers were served at the Portland International Airport in 1997.

Tigard is also served by the Portland-Hillsboro Airport, a general aviation facility located in the north central portion of the City. The airport facility is owned and operated by the Port of Portland as part of the Port's general aviation reliever system of airports. The Port of Portland maintains a Master Plan for this facility which was most recently updated in October, 1996.

WATER

The Tualatin River is located along the southern border of Tigard. It is used primarily for recreational purposes. No policies or recommendations in this area of transportation are provided.

PIPELINE

There are high pressure natural gas feeder lines owned and operated by Northwest Natural Gas Company along several routes in Tigard. Figure 3-18 shows the feeder line routes for Tigard.[19].

[19] Based on the Portland Area Distribution System Map (Dated September, 1998) received from Northwest Natural Gas Company.

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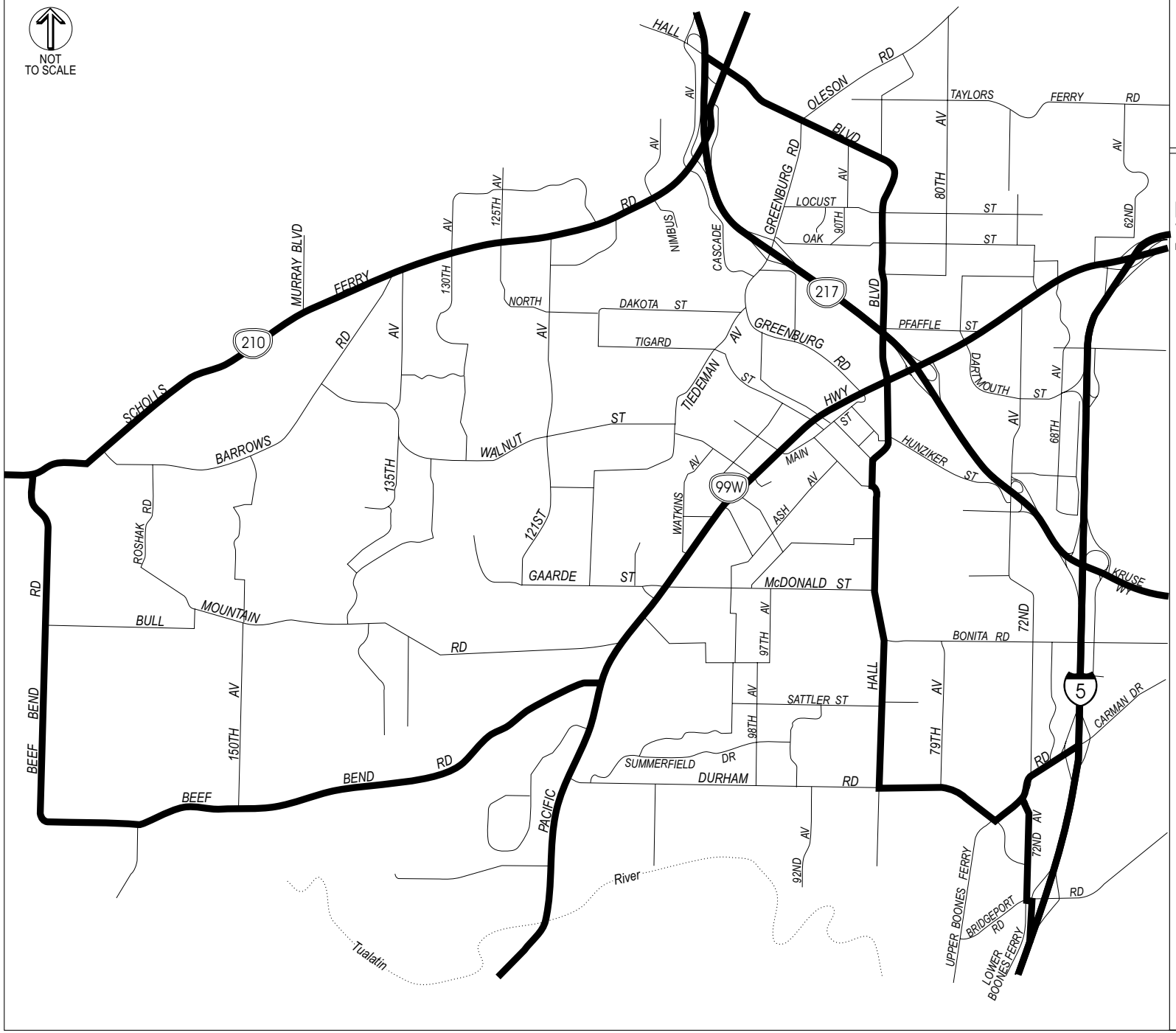

CITY OF TIGARD

Transportation Systems Plan

Legend

- Existing Truck Routes

Figure 3-17
EXISTING TRUCK ROUTES

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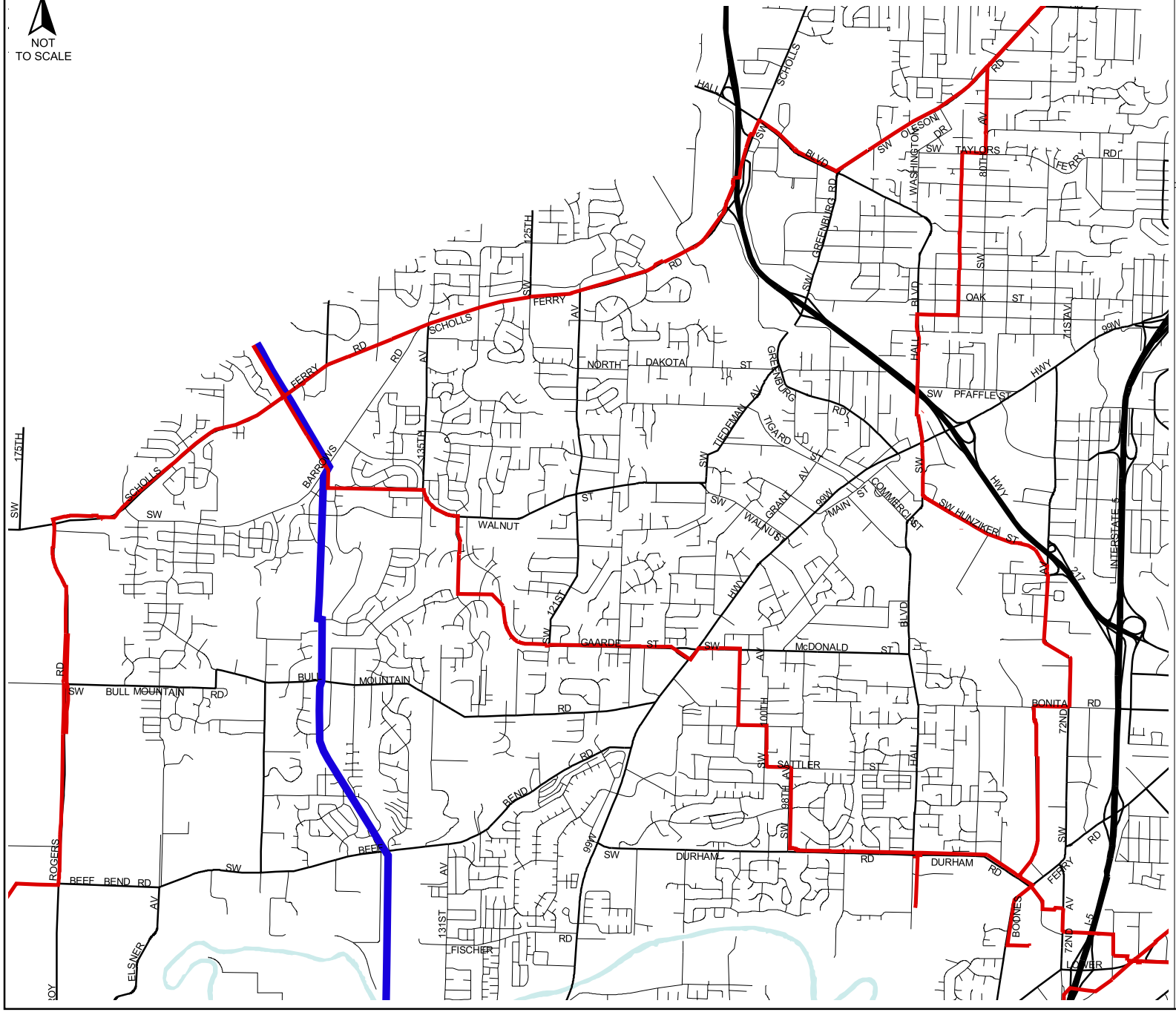

CITY OF TIGARD
OREGON

Transportation Systems Plan

Legend

- Existing High Pressure Gas Pipeline
- Existing Kinder Morgan Pipeline

Figure 3-18
MAJOR PIPELINE ROUTES